THE DIFFUSION OF CRISIS INFORMATION: A COMPUTER SIMULATION OF SOVIET MASS MEDIA EXPOSURE DURING THE CUBAN MISSILE CRISIS AND THE AFTERMATH OF PRESIDENT KENNEDY'S ASSASSINATION

by

HERBERT LAWRENCE SELESNICK

B.S., Massachusetts Institute of Technology

(1962)

M.S., Massachusetts Institute of Technology

(1964)

SUBMITTED IN PARTIAL FULFILLMENT

OF THE REQUIREMENTS FOR THE

DEGREE OF DOCTOR OF

PHILOSOPHY

at the

MASSACHUSETTS INSTITUTE OF

TECHNOLOGY PART I

June, 1970

Signature of Author...

Department of Political Science, May 14, 1970

Certified by......................

Thesis Supervisor

Accepted by...

Chairman, Departmental Committee
on Graduate Students

ABSTRACT

The Diffusion of Crisis Information: A Computer Simulation of Soviet Mass Media Exposure During the Cuban Missile Crisis and the Aftermath of President Kennedy's Assassination

by

Herbert L. Selesnick

Submitted to the Department of Political Science on May 14, 1970 in partial fulfillment of the requirement for the degree of Doctor of Philosophy

During October of 1962 and again in November of the following year, the world was plunged into crises by the Cuban missile confrontation and the assassination of President Kennedy. Sovietologists and knowledgeable persons who have since left the USSR report that Russian media delayed covering significant aspects of the Cuban crisis, but that virtually all aspects of the Kennedy assassination received prompt and heavy coverage. To assess the probable exposure consequences of this reportage we have used a computerized simulation model of the Soviet mass media system to postdict the frequency and reach of Cuban crisis and Kennedy assassination messages in the system from known facts about the population, its media habits, and the content of the mass media.

Data about the population and its media habits were taken from published Soviet census statistics and time budget studies, and from a survey by American social scientists of how Soviet refugees and visitors to West Europe used their leisure time while in the USSR. Content analyses of (1) the Russian press, (2) FBIS monitoring reports on Soviet domestic radio transmissions, and (3) VOA and Radio Liberty news transcripts, provided a set of messages representative of the flow of media material. Soviet television messages were postulated from the domestic radio messages, and incoming BBC messages were postulated from the content of contemporaneous issues of the London Times. The messages thus identified by the content analyses were aggregated in themes which served as input to the simulation.

For six Cuban crisis and four Kennedy assassination themes, we described by sex, age, education, urban or rural residence, and Party or nonParty membership, the growth and distribution of exposure, the most and least exposed population subgroups, the duplication of exposure across themes, and the most important types of media in producing exposure to themes. The simulation results showed foreign radio as having played a major role in bringing news of both events, and especially the Western version, to the Russian population. They also showed domestic radio as having provided the first (and an early) source of mass media information for most of the population. Comparing the two crises, we observed in the simulation outcomes that the Kennedy assassination themes penetrated the population much more rapidly and in greater depth. In both cases, however, the simulation postdicted that the better educated, the young, and (to a lesser extent) urbanites were more rapidly and heavily exposed than others, especially by means of foreign radio and domestic newspapers. Extending this analysis, we proposed a simple hypothesis, which conformed to the simulation results, relating the variation of exposure with education to the degree of complexity of a communications situation. Finally, we attributed the declining importance of domestic radio among urbanites, between the first and second simulations, largely to the growth of the urban television network between 1962 and 1963.

Thesis Supervisor: Ithiel de Sola Pool
Title: Professor of Political Science

ACKNOWLEDGEMENTS

For me, a particularly rewarding by-product of this thesis experience has been the making of a valued friend. Dr. John F. Kramer and I programmed the simulation computer model together, over an eighteen month period, sharing not only the ultimate satisfaction of success but long hours of warm cameraderie as well. I wish to thank Professor Ithiel de Sola Pool for his counsel and assistance during my years as a graduate student at M.I.T. His intellectual guidance and moral support contributed greatly to the production of this monograph. I am grateful to Professors Daniel Lerner and Donald L. M. Blackmer, for serving on my thesis committee and giving the manuscript their critical reading.

Dr. Rosemarie Rogers was kind enough to make available her secondary analysis of the Comcom Leisure Study interviews, and she offered many valuable suggestions regarding the use of the data as well. I wish to thank her for this help. I am indebted also to Dr. John Nagle and Mr. John Klensin for the long hours they spent running the simulation, to Misses Katherine Caruthers and Julia Swain who drew and redrew the exposure graphs, and to Mrs. Christian Van Panhuys for providing dependable administrative assistance.

And to my wife, Judy, who spent endless hours editing, typing, and critiquing the drafts, my special thanks and deepest love. Without her confidence and love I could never have completed the thesis.

The research for this monograph was supported in part by a grant under contract number 920F-9717 of the Advanced Research Projects Agency, Department of Defense, administered through the Center for International Studies at M.I.T., and in part by Project MAC, an M.I.T. research program also sponsored by the Advanced Research Projects Agency under Office of Naval Research Contract number Nonr-4102(01).

CONTENTS

LIST OF TABLES

Table | Page

Table		Page
7.8.	The exposure of the simulated Soviet population to individual Kennedy assassination themes after twenty-four hours of the scenario	771
7.9.	Cumulative and repeat exposure to selected subgroups of the simulated Soviet population to individual Kennedy assassination themes after twenty-four hours of the scenario..	779
7.10.	Most and least exposed subgroups of the simulated Soviet population for individual Kennedy assassination themes, after twenty-four hours of the scenario........	787
7.11.	Percentage of total exposures to individual Kennedy assassination themes after twenty-four hours of the scenario...	795
7.12.	Cumulative and repeat exposure of selected subgroups of the simulated Soviet population to individual Kennedy assassination themes, via each media type after twenty-four hours of the scenario......................	797
A.1.	Estimated format factors for the simulated Soviet print media ,,,,...	802
A.2.	Estimated format factors for the simulated Soviet electronics media......................................	809
A.3.	Estimated format factor for the simulated foreign radio media..	811
B.1.	Code sheet used in the content analysis of Soviet newspapers published during the Cuban missile crisis...	821
B.2.	Code sheet used in the content analysis of Moscow Central Radio broadcasts transmitted during the Cuban missile crisis	822
B.3.	Code sheet used to infer the content of Moscow Central Television broadcasts transmitted during the Cuban missile crisis	823

Table		Page

LIST OF ILLUSTRATIONS

Figure Page

LIST OF GRAPHS

Graph | Page

CHAPTER I

INTRODUCTION

CHAPTER I

INTRODUCTION

The Problem

This thesis is concerned with three distinct problems: It reports on a basic research effort in which the author has participated for some time--the design and implementation of a computer-based model of communication systems.*1 It also addresses the simulation problems of using this model (1) to produce a static description of the Soviet mass media system and (2) to produce a dynamic representation of message flows within this system during two crisis periods.

In developing the model we addressed ourselves to the problem of ascertaining who attends to the flow of

---

*1The development of this model has been a major objective of the Comcom Project--part of a research program on problems of communication and international security conducted by M.I.T.'s Center for International Studies. Under the direction of Professor Ithiel de Sola Pool, the Comcom Project has pursued two efforts: first, to acquire data on the communication systems of the Soviet Union and Communist China, and second, to design, program, and implement a computer simulation model that can be used to test the likely spread of information within these two countries in a variety of future situations. The author and a colleague, John F. Kramer, have developed most of the simulation programs.

material in the mass media. For many countries, a variety of secondary sources provide aggregate data on the population's media use habits and on the media's coverage of particular events. By simulation we can

--produce a coherent description of a hypothetical mass media system which might have generated all of the observed aggregate data, and

--reconstruct the way messages about specific events might have flowed to the population of this system as a result of the observed media coverage.

Major conceptual problems dealt with in the model include

--establishing, for each demographic and social stratum of the audience, the distribution of exposure probabilities over the major media;

--representing the time dependence of successive new exposures to a given medium, or to a message occurring in several media at different times, i.e., the problem of cumulation;

--expressing the dependence of exposure probabilities between media, i.e., the problem of duplication of coverages among media;

--determining the selectivity of response by members of the audience to different messages within fixed media;

--summarizing the sequence of messages occurring in the media.[1]

All of these processes affect who gets exposed to what media material.

The second problem with which this thesis is concerned is that of using the model to simulate the <u>structure</u>

of the Soviet mass media system. The specific problem is to estimate a large number of Soviet audience parameters when only partial data is available. Circulation figures for most of the important print media and data on the distribution of electronic media are available. However, there are no good audience figures for print media, nor are there any audience ratings for the electronic media. Interviews covering media use have been conducted outside the Soviet Union with former residents of the country and with Soviet visitors to Western Europe. In addition, there are studies describing people's time allocation to reading, radio-listening, TV-viewing, etc. We have used these two sources along with the Soviet-published data (and a certain amount of speculation) in an attempt to derive the parameter estimates needed for structuring the Soviet mass media system.

The third problem to which we address ourselves is that of simulating the flow of messages within this system. Specifically, we have attempted to simulate the flow of messages through the mass media to the Soviet population during the period of the Cuban missile crisis and the aftermath of President Kennedy's assassination. Data on the media coverage of these two events is available in a variety of sources. These include samplings of Soviet press and radio coverage (published by the Social Science

Research Council and the Foreign Broadcast Information Service respectively), contemporaneous issues of the major Soviet print media, and transcripts of foreign radio broadcasts to the Soviet Union. However, there are no sources which indicate how the lower level press treated these events, monitoring reports cover only central radio, and there are no data on television coverage. Published studies of the Soviet press do provide a general picture of how the content of lower level papers differs from that of republic and central papers, and monographs on Soviet radio and television broadcasting make similar comparisons for central and local broadcasts. These studies also provide publication frequencies and broadcast schedules. Journalistic accounts of the media coverage contain hints as to how various subgroups in the Soviet population might have responded to media material at the times in question. By content analyzing the secondary sources and drawing inferences from the descriptive material we have attempted to reconstruct the sequence of messages which appeared in the mass media and the ways in which audiences received them during these two periods. We then confronted our static representation of the Soviet mass media system with these dynamic message flows in order to produce simulated exposure histories.

The simulated exposure outcomes were interrogated in several ways. We used them to answer (hypothetically) the following kinds of questions:

1. What proportion of the Soviet population heard about each event?

2. How did that proportion differ from city to country, from Party member to nonParty member, from the educated to the uneducated, from young to old, from men to women?

3. Which people heard the Western version of events?

4. How long did it take the majority to hear it?

5. How many heard it confirmed a second and third time?[2]

Having described the principal areas of concern in this thesis, we turn next to a brief discussion of their significance. In the following paragraphs we identify some of the reasons for studying mass media exposure. We also discuss the advantages of simulating a communication system on a computer and the practical value of being able to simulate message flows within the Soviet system during crisis periods.

Identifying audiences

A principal reason for studying mass media message flows is that they are part of a universal social process.

Together with face-to-face message flows they constitute communication (in the social sense of the word), and communication is a pervasive aspect of any society. Accordingly, we can develop our understanding of a given society as a system by learning how messages flow to its population through its mass media.[3]

We study mass media communication because it is an increasingly important process. The world-wide network of mass media has grown enormously in the past century and its audiences have become larger and more heterogeneous. Both of these developments have been associated with the industrial and technological revolutions in general, and with the spread of urbanization and literacy in particular. Since the 1920's--when the ability of the mass media to reach and influence large audiences first became the subject of systematic study--there have been three main stimuli to the development of domestic communications research: interest in the intra-nation use of propaganda that followed the First World War; generalized concern over the cultural and moral effects of an expanding mass media system; and commercial interest in the audiences of the mass media.[4] International communications research--focusing on the strategic (inter-nation) use of shortwave propaganda[5] and the potential role of communications research in the service of international organization[6]--

began during the Second World War. Its development since then has been stimulated by two major trends: the expanded activities of governments in spreading their information and propaganda throughout the world; and the spread of the technological means of mass communication into the non-industrialized areas of the world.[7] So in this century mass media communication has been a growing concern of commercial, cultural and political research.

The mass media have always been interested in the audiences they reach because this is a key factor in their competition for advertising revenue. The first commercially sponsored studies conceived of audiences as homogeneous masses of individuals and were primarily concerned with the number of people reached. However, since the early 1940's a growing body of research has shown that audiences are highly structured and that individuals play important roles in deflecting and/or spreading the influence of the media.[8] Responding to these findings, commercial audience research has focused on finer and finer differentiations and has developed numerous criteria--demographic, socio-economic, psychological, social and communication--for classifying audiences. The mass media are today as much concerned with <u>who</u> they reach as with <u>how many</u> they reach. They have developed increasingly precise measures of audience size and composition and, over the years, a vast number of differential exposure studies have accumulated for each of the media.[9]

The advertising industry, its clients, and cometimes the media themselves face a fundamental problem closely related to the concerns of this thesis: the "media-mix" problem. Generally formulated, this is the problem of allocating appropriations among message vehicles (particular magazines, TV programs, etc.) in such a way as to obtain the maximum possible impact on a pertinent target within a given budget.[10] In the commercial sphere this involves an advertising budget and a marketing target and the objective is to elicit a particular sales response. Although there is no direct relationship between the number of exposures to advertising and the sales response, most approaches to the media-mix problem attempt (quite reasonably) to maximize the number of "effective" exposures (i.e., exposures of likely consumers) that can be attained within the advertising budget.[*1] This involves the establishment of an optimum advertising schedule based on a knowledge of the

---

[*1] There are five prior conditions that must be met before an advertisement can have an effect, whatever that effect may be: (1) media distribution; (2) exposure to the message vehicle; (3) exposure to the particular advertisement; (4) perception of the advertisement; (5) advertising influence (see, e.g., Edwin B. Parker, Stewart A. Smith, and John Scott Davenport, "Advertising Theory and Measures of Perception," Journal of Advertising Research, III, No. 4 [1963], 40-43).

unduplicated audience in each of the target subgroups of a population for each of several candidate message vehicles. The optimization criterion is generally a combination of reach objectives (highest net coverage at lowest cost) and frequency objectives (n-repeated coverage at lowest cost).

Three systematic approaches to the media-mix problem have emerged in recent years: mathematical formulas, mathematical programming, and simulation. Formulas have generally been used to estimate unduplicated audiences for combinations of message vehicles.[*1] Their precision is

---

[*1]Most of these formulas are modifications of formulas developed by Sainsbury and Agostini. The main weakness of Sainsbury's approach is that it is based on a random hypothesis, i.e., that the probability of exposure to a message vehicle is independent of the probability of exposure to any other message vehicle. Agostini's formula, while more refined, has the practical limitation that it requires knowledge of the pairwise duplications between all combinations of message vehicles within each group of the population for which net audience estimates are to be computed. For examples of mathematical methods of estimating net audiences, the reader is referred to J. M. Agostini, "How to Estimate Unduplicated Audiences," Journal of Advertising Research, I, No. 3 (1961), 11-14; John Bauer, "Seven tests of Agostini's Formula," Journal of Advertising Research, III, No. 1 (1963), 13-20; J. M. Caffyn and M. Sagovsky, "A Comparison of the Agostini and Sainsbury Methods," Journal of Advertising Research, III, No. 1 (1963), 21-25; Marcel Marc, "Agostini's Formula Applied to Special Markets," Journal of Advertising Research, III, No. 1 (1963), 26-29; Walter Kuhn, "A New Formula," Journal of Advertising Research, III, No. 1 (1963), 30-33; Ronald B. Kaatz, "Improving Agostini's Formula for Net Audience," Journal of Advertising Research, III, No. 3 (1963), 43-44; Richard B. Metheringham, "Measuring the Net Cumulative Coverage of a Print Campaign, Journal of Advertising Research, IV, No. 4 (1964), 23-28; Stig

unpredictable because they do not include the determinants of cumulation or duplication. As a result, formulas developed for estimating audiences in one country have proved inaccurate when used for estimating audiences in other countries.

Mathematical programming solutions to the media-mix problem have been widely discussed. Linear programming is perhaps most representative of this approach.[*1] Although

---

Marberg, "A Visual Aid to Estimating Net Audiences," Journal of Advertising Research, VI, No. 3 (1966), 21-28; Pierre Hofmans, "Measuring the Cumulative Net Coverage of any Combination of Media," Journal of Marketing Research, III, No. 3 (1966), 269-78.

[*1]Linear programming is an operations research technique that is uniquely applicable to problems where the purpose is to maximize (or minimize) a given linear function (called the objective function) under constraining conditions that can be represented by linear inequalities. In the linear programming media-mix model, the objective function expresses the contributions of particular advertising units to total advertising effectiveness. The variables in the function are the dollars invested in individual media, and for each such variable there is a multiplicative constant which represents the number of prospective consumers reached by the individual medium per dollar invested. Linear inequalities are used to express restrictions imposed on solution values of the variables by the budget, the characteristics of the available media, and other environmental conditions. There are also non-negativity requirements which prevent infeasible solutions involving negative values of the variables. Solution of a correctly formulated model (which has to be done on a computer) will indicate the particular advertising units to be included in the media schedule and the number of uses of each which will result in reaching the greatest number of prospective consumers within a given budget.

The first announcement of a serious effort by a U.S. advertising agency to use linear programming in media linear programming is a more sophisticated media selection technique than the formula approach, it too has its limitations, which may be summarized as follows: (1) It is only applicable if all the relationships in the problem can be regarded as linear. In reality, however, audience response functions are seldom linear. For example, multiple exposures may at first produce increasing returns (perception) and later produce diminishing returns (saturation).[11] (2) Linear programming models generally do not account for cumulation or duplication.[12] (3) Audience data for various media are not always available on the consistent basis required by linear programming models and,

---

selection was made in 1961. A series of papers dealing with this subject was presented at the 1961 Eastern Annual Conference of the American Association of Advertising Agencies (American Association of Advertising Agencies, Mathematical Programming for Better Media Selection, Papers from 1961 Region Conventions [New York: American Association of Advertising Agencies, 1961]). For additional applications of this technique the reader is referred to Day, "Linear Programming"; James T. Engel and Martin R. Warshaw, "Allocating Advertising Dollars by Linear Programming," Journal of Advertising Research, IV, No. 3 (1964), 42-48; Douglas B. Brown and Martin R. Warshaw, "Media Selection by Linear Programming," Journal of Marketing Research, II, No. 1 (1965), 83-88. Mathematical methods of media selection was the subject of the sixth meeting of the Advertising Research Foundation's Operations Research Discussion Group (Advertising Research Foundation, Inc., Mathematical Methods of Media Selection: A Report of the Sixth Meeting of the ARF Operations Research Discussion Group [New York: Advertising Research Foundation, Inc., 1966]).

in any event, are seldom available for target subgroups.

The media-mix problem has been simulated on a computer. A computer program developed by the Simulmatics Corporation accounts for cumulation and duplication and accepts audience data in various formats and levels of specificity.[*1] The Media-Mix simulation--a far more sophisticated technique for media selection than any of the other methods currently in use--has provided a point of departure for the development of the Comcom simulation which is reported on in this thesis.

Cultural concerns with mass media communication have focused on its effects.[13] One fear, voiced quite

---

[*1] The Media-Mix simulation represents the flow of messages through the mass media to the American population. A population of a few thousand individuals--representing a sample of the population of the U.S.--is symbolized in the computer. Each individual has certain social and demographic characteristics. In the static part of the simulation, the computer performs a large data processing operation on Nielsen ratings, ABC circulation figures and various media surveys, to obtain the media habits of each symbolic individual. In the dynamic part of the simulation, a flow of messages is released to the population through various media (the advertising schedule is input) and the computer calculates the probability of a message having been received by any given type of person after any given period of time. Based on these probabilities the computer then produces an estimate of how many people have seen a particular advertisement and with what frequency (Simulmatics Corporation, "Simulmatics' Media-Mix I. General Description," New York, 1962. [Mimeographed.]; Simulmatics Corporation, "The Simulmatics' Media-Mix. Technical Description," New York, 1962. [Mimeographed.]).

often in the past, was that the media were accelerating America's conversion to a "mass society." This fear reflected an overestimation of the power of the mass media coupled with a general ignorance of the role of face-to-face communication in mediating their effects.[14] As we mentioned above, research findings have shown that media attendance takes place in a social matrix. Additional findings with regard to individual variability of response to communications complicate the picture still further. In most systematic experimental studies of the effects of communications, differential impact has been explained in terms of differential characteristics of the target population.[*1] Accordingly, any study of the impact of the mass media (cultural or otherwise) must determine the relative <u>distribution of effects</u> throughout the entire population, and this will be a function of the distributions

---

[*1] Some of the research findings which reflect response variability and the fact that content cannot be simply equated with effect are as follows: It is easier to transmit information than to change attitudes; Simpler material is more readily comprehended when presented orally, more complicated material when presented in written form; Two-sided arguments make the audience more resistant to counter-propaganda; People remember more of arguments congruent with their values; If a communicator is not trusted, the audience is less likely to accept his point of view; In cohesive small groups, communications are more likely to be directed at those who deviate from the group norm; In disintegrating small groups, persons who have had their confidence in their opinions shaken are more likely to talk with persons who agree with them in attempts to restore their previous level of confidence.

of relevant characteristics across the population. Exposure to media material is one such characteristic.

The first political studies of mass communication were also preoccupied with the potential power of the media. They focused on the social problems of controlling the propagandist, concentrating on what was said and how it was phrased (content analysis).[15] In the late 1930's attention shifted to who was doing the propagandizing[16] and, subsequently, to the effect of propaganda on public opinion. More recent research findings have highlighted the crucial role exposure variables play in determining these effects. Examples of such findings are as follows: (1) The more personalized the message vehicle by which a person is exposed to propaganda (television over newspapers, e.g.) and the more specialized it is to his predispositions, the more likely it is to alter his opinion; (2) Communication content is more effective in converting public opinion if it relates to new, unstructured or peripheral issues rather than to issues highly correlated with existing attitude clusters; (3) The makeup of any medium's audience (degree of heterogeneity, distribution of predispositions, etc.) influences the net impact that messages in that medium can have on public opinion; (4) Propaganda is more effective in opinion conversion under monopolistic conditions than under competitive conditions.[17]

A knowledge of how messages flow via the mass media is important to at least three types of practitioners of political research: evaluators of overseas information programs; political development theorists; and students of comparative politics. In evaluating international broadcasting programs the question of who is speaking is ordinarily omitted, because the evaluation has usually been ordered by the speakers themselves.[*1] The question of what is said can be answered in considerable detail by content analysis. Audience provides the major link between specific content and observed or anticipated effects. Audience size *per se* is not the yardstick of success, however. As in advertising, "effective" exposures are what count. We have here another variant of the media-mix problem, i.e., the problem of selecting a schedule that

---

[*1] Since the Second World War, national governments have been the major sponsors of international communications research and the most successful developers of methods for identifying the audiences actually reached by international communications. The United States has invested large amounts of money in efforts to "pre-test" or "post-evaluate" particular aspects of its international information program. For example, there have been large research projects to measure the audiences for, and the impact of, the Voice of America in different parts of the world. Abroad, agencies of the British and French governments' overseas information programs have conducted similar research, and many governments have set up National Institutes of Public Opinion Research.

will efficiently reach predetermined target groups.*[1] To the evaluator or the policy-maker, this might mean beaming sophisticated political programs to elite groups who appear to exert most of the control over domestic and international policies of the target country. But international broadcasters must also be concerned with the <u>local</u> communications to which the target audiences are exposed, so that their broadcast strategies can take into account influences on the target population by other media.

Mass media exposure is associated with change toward modernization. While it is true that the media by themselves cannot produce broad characterological changes in individuals, both Lerner and McClelland have gathered evidence in support of theses that the media, in conjunction with secular trends and cultural influences, can contribute to such changes.*[2] Also, experimental and survey data

---

*[1]The vehicles of international mass communications include, for these purposes, wire and wireless press dispatches, short-wave radio broadcasting, satellite television, moving pictures, magazines and books.

*[2]Daniel Lerner, <u>The Passing of Traditional Society: Modernizing the Middle East</u> (Glencoe: Free Press, 1958) and David C. McClelland, <u>The Achieving Society</u> (Princeton: Van Nostrand, 1961). Mass media exposure affects, and is in turn affected by, the secular trends common to most developing countries--the spread of urbanization and literacy, increased political participation, economic integration, and the growing penetration of the media. Studies of the media habits of both peasants and urbanites in developing

suggest that the mass media can produce _direct_ changes in attention, information, tastes and images--cognitive variables that are known to be related to the processes of social and political development.[*1]

Finally, mass media communication is important in the study of comparative politics. If communication is a good index of any society, then it is a good _comparative_ index. The role of the mass media varies from one country to another, but in all countries it is a function

---

countries reveal a general pattern of overlapping audiences for the mass media. Attributes such as cosmpolitanness and functional literacy have been found conducive to media participation while empathy, innovativeness, and political knowledgeability are some of the consequent variables that have been identified. In addition to Lerner and McClelland, see, e.g., Everett M. Rogers, "Mass Media Exposure and Modernization Among Colombian Peasants," _Public Opinion Quarterly_, XXIX, No. 4 (1965), 614-25; Frederick W. Frey, _The Mass Media and Rural Development in Turkey_ (Cambridge: Center for International Studies, M.I.T., 1966); Orlando Fals-Borda, _Subversion and Social Change in Colombia_ (New York: Columbia University Press, 1969).

[*1]Research findings suggest that the mass media operate very directly on these variables. Changes toward modernization in _attention_, _information_, _tastes_ and _images_ have commonly been referred to as the "revolution of rising expectations." Research findings also indicate that the media by themselves generally do not influence _behavior_, _skills_, or _attitudes_. Changes toward modernization in these variables usually require effective political organization paralleling the media. For a discussion of this distinction see Ithiel de Sola Pool, "The Mass Media and Politics in the Modernization Process," in _Communications and Political Development_, ed. by Lucian W. Pye (Princeton: Princeton University Press, 1963).

of their accessibility and of the population's actual exposure to media material.*1 Existing records often give us information about the number of radio and television sets which have been sold or are in use and the circulation figures for newspapers in a country, but they normally do not provide data on whom the media reach and with what frequency. Simulation may be able to help us answer these important questions.

Can simulation help?

We have chosen to simulate a communication system for two reasons: The advantages of simulating such a

---

*1 A truly comparative approach must clarify the role of the mass media, at different levels of specificity, from one country to another. Within a country the role of the media will vary for different subgroups in the population; the role of one medium will differ from that of another; and one segment of any medium will perform different functions from another. Comparative research asks several questions in this regard: How available and how widely distributed are the media to different segments of the population (the question of penetration)? What is the relationship between accessibility and actual exposure (the question of media use)? What are the restrictions on accessibility and the resistances to exposure (the questions of literacy, censorship, political and social integration, etc.)? The relevance of these questions varies with the country being studied. In a country where most of the mass media are accessible to everyone, such as the Soviet Union, questions of exposure and resistances to exposure require primary attention. In a country where the distribution of the mass media is limited, such as China, accessibility and restrictions on accessibility are perhaps more crucial problems.

system are sufficient to make the effort worthwhile and the nature of the problem is such that simulation is feasible.

Simulation has enabled us to predict the behavior of a communication system under hypothetical future circumstances when we could not otherwise have done so. It has similarly enabled us to reconstruct (postdict) the historical though hitherto unknown behavior of a communication system under past-recorded circumstances. Until now there have been two obstacles to these kinds of predictions: (1) A mathematical model embodying the complex propositions about mass media communication is not analytically solvable for the exposure outcomes in which we are interested; (2) Even if it were, the memory capacity needed and the number of computations involved would be prohibitive because of the vast amount of data required for estimating parameters in such a model. However, by expressing our model in a simulation program and by running that program on a high-speed computer, we have been able to overcome both of these problems and produce verifiable model outcomes.

A second advantage we have derived from simulation is the acquisition of data important to our understanding of mass media communication systems. Our simulation utilizes such familiar problem-solving algorithms as probability theory, linear programming, matrix algebra and analytic geometry.[*1] Simulating the interplay of these algorithms not only produces a series of predictions about ultimate exposures but also provides us with information on such intermediate phenomena as vehicle audiences, their buildup and overlap. By comparing these intermediate outcomes with real world counterpart data, we have been able to determine the extent to which our simulation algorithms faithfully depict the <u>workings</u> as well as the <u>outcomes</u> of a mass media system. The simulation thus serves a heuristic function, because it allows us to use familiar statistical mechanisms in explaining how quantitative proportions of a population are exposed to material in the mass media.

Simulating a communication system also has a number of practical advantages. Now that it has been constructed, the Comcom simulation constitutes an experimental system which can be manipulated in a vast number of exploratory ways. Three features enhance these experimental possibilities: (1) The body of propositions built into the simulation is sufficiently powerful that it produces interesting results even for countries on which very little communications data is available; (2) The simulation

---

[*1] We describe these algorithms in Chapters II and III.

programs are structured for easy factorization so that incremental variations or new propositions can be readily incorporated into the model and the entire model can itself be incorporated into larger simulations; (3) The simulation is programmed to provide on-line user access.*1 As a result of these features, simulation runs can be executed for a variety of experimental purposes, as for example,

--to compare the diffusion of news events in different countries (totalitarian vs. nontotalitarian, developing vs. developed, Western vs. Eastern, etc.),

--to compare exposure patterns among various groups of the population within a single country,

--to explore the implications of alternative sets of assumptions that can be substituted for or added to those already in the simulation, and

--to perform sensitivity analyses, i.e., to observe how manipulating given parameters affects model outcomes.

These exploratory possibilities make the simulation a valuable tool both for students of mass communication and for practitioners of communication-related strategies.

---

*1 In Chapters II and III we also describe the basic assumptions and propositions underlying the simulation model. Currently in preparation are a programmers' manual and a users' manual which cover, respectively, the detailed structure of the simulation programs and their operation on M.I.T.'s IBM 7094- and 360-based time-sharing systems.

The simulation is a teaching machine. Area students can use it to observe media exposure patterns for particular countries in which they are interested. Students of communication theory can, by studying the simulation algorithms, acquire a statistical understanding of mass media communication. They can broaden and refine this understanding by observing the consequences of changing different parts of the simulation model. Sensitivity analyses can be used to help investigators decide whether or not to collect various types of data on particular communication systems.[18]

The simulation can be used by communication strategists and policy makers--political or otherwise. The relevant question here is not how well our simulation performs in some absolute sense, but whether it accounts for exposure consequences <u>better</u> than they are presently being accounted for in the calculations of policy makers. We believe the answer is yes, primarily because the complexity of a mass media system makes it virtually impossible for any one person to hold all the relevant details in his mind. Every communicator wants to know whether his message is getting through, to how many people, and with what competition. Up to now he has only been able to guess that "most people," or "almost everyone," or "just a few people" have been or will be made aware of a particular fact. Here, the advantage of the simulation is that it allows the policy maker to substitute rough numerical estimates (like 10% or 20% or 60%) for his present, even rougher, verbal estimates.[19] A further advantage is that the practitioner can play out the consequences of alternative policy decisions without having to suffer the actual consequences. For example, he can observe in a few hours of real time the hypothetical exposure outcomes that would result from several contemplated information campaigns. If evaluation of these campaigns had required that they actually be launched, the result might have been a substantially greater investment of time (waiting for the results of weeks and months of media exposure) and money (purchasing the schedule).

Even though there are abundant reasons why communication simulation is <u>desirable</u>, we could not have undertaken the effort unless it were also <u>feasible</u>. For a computer simulation to be feasible, there must exist a complex structure of propositions and/or data values related to the problem under consideration.[20] As we mentioned earlier, we have developed just such a structure of propositions--in the form of statistical algorithms that reproduce several kinds of aggregate communications data for a mass media system. We also referred earlier to the fact that various kinds of data are available on mass media systems throughout the world. So two conditions exist, either one of which is necessary and sufficient for making simulation feasible.

How do we know our theory of mass media communication is simulable? The essential questions which we have had to resolve in this regard are the following:

--Can we represent the <u>salient</u> features of a mass media system, i.e., are selection criteria available?

--Can we state the variables and their relations with sufficient precision to produce a determinate solution to a closed system?[*1]

--Does the resulting model contain implications of a non-obvious character, i.e., might new consequences of the model be discovered by simulating it?

The decision to simulate was based on an affirmative answer to all three of these questions.[*2]

[*1] Actually, because we opted for a stochastic model, this question was phrased somewhat differently, as follows: "Can we state the variables and their relations with sufficient precision to produce a specific prediction of the statistical distribution of a set of exposure outcomes?"

[*2] The computer facilities available to us at Project MAC and at the M.I.T. Computation Center also weighed heavily in the decision to undertake a computer simulation. The time-sharing systems of these two installations feature the IBM 7094 computer, a machine which has a relatively high computing speed and a large storage capacity. Both time-sharing systems allow on-line user access, a feature which speeds up design and debugging processes considerably, and both systems accept programs coded in MAD, a well-known algebraic compiler language (see p. 37 below, n.*1). This language is a relatively simple and therefore desirable one to use from the standpoint of social scientists who are "doubling" as programmers.

There are numerous criteria for selecting the salient aspects of a mass media. We know the important basic units--audiences, media and messages. The properties of each of these units that need to be represented in a model are largely determined by the kinds of data available on various communication systems and by a number of well-known propositions about the determinants of media use. Inputs and outputs stem from our substantive concerns--message occurrences in the mass media and the resulting exposure outcomes within a population. Finally, the processes in the model and their phasing have been dictated by computer requirements, the nature of the statistical packages used, and a number of arbitrary assumptions.

An accurate simulation of the complete Soviet communication system is not now attainable. There are both theoretical and empirical problems which must be solved before it will be possible to simulate such Soviet communication networks as rumor, face-to-face contact, and dissemination by Party channels. This thesis takes an experimental approach to the simulation of only one (but a major) component of the Soviet communication system--mass media message flows. Even this much was not possible until some intellectual and empirical problems had been overcome.

The success of the Media-Mix simulation, referred to above, has strongly suggested from the outset that it is possible to meet the theoretical requirements of a Soviet communication simulation. Several components of the Media-Mix model have become building blocks in the more elaborately structured Comcom simulation. (The major conceptual problems encountered in the design of this model have been outlined above.) The basic model which has been developed for the Comcom simulation requires as an input, among other things, a description of a representative sample of the Soviet population. Each individual must be characterized not only by his demographic, social and political attributes, but also by his media habits. All such empirical information must be represented in the sample computer population before alternative media contents can be released to the population and exposure histories simulated. Examples of the kind of media-use data we are talking about are the distribution of newspaper reading by paper, type of story, etc., among rural persons, Party members, the uneducated, etc. Such data was heretofore nonexistent for the time period of interest: 1962-63. Thus, as the simulatiom model was being designed and programmed, a major empirical task has also been underway--the accumulation of data on the media habits of different kinds of individuals in the Soviet Union. Fortunately, it has been possible to gather this data as well as the other kinds of information required by the simulation model. Newspapers, broadcasts, and other modes of disseminating information to a whole population are by their very nature open to analysis. The successful accomplishment of this empirical task and the development of an operational computer model of mass media exposure mean that now, for the first time, experimental simulations of Soviet mass communication are feasible.

Soviet communication

In this thesis we demonstrate how simulation can be used to obtain various kinds of quantitative estimates of the spread of information via the mass media in the Soviet Union. (For example, we use simulation to determine approximately how many and what types of persons in the USSR might have been reached by newspaper stories about the U.S. naval quarantine during the first twenty-six hours of the Cuban missile crisis.) Our objective is to show that a computer model of Soviet mass media communication has promise of producing considerably more refined estimates than are now possible of the rate at which information about world events is diffused via the mass media throughout the Soviet Union. There are at least two reasons why this kind of undertaking is worthwhile: (1) Media development in the Soviet Union, as in all societies, is intimately related to the broader processes of political, economic and social development. A research tool which generates numerous reliable indices of Soviet media development provides data important to an understanding of the general development process. (2) Communication is an increasingly significant aspect of international controversies. In a confrontation between the United States and the Soviet Union, American decision-makers could use simulation to assess the communication consequences of various actions which they might be contemplating.

As the Soviet Union is changing from an underdeveloped into an industrialized nation, its communication system is changing from a word-of-mouth system into a mass media system.[21] This has affected message flows in two ways. The Soviet Union is becoming increasingly open to messages from the outside world. A number of factors are responsible for this development: the vast increase in the number of Soviets who have the physical possibility of hearing foreign radio broadcasts; exhibits, dramatic performances, filmed television programs and other such items that are part of the growing number of cultural exchange programs; increased contact with visitors from abroad as well as travel abroad by Soviet citizens; the growing availability of printed matter from abroad; an increasing amount of international information now available in Soviet domestic media. These changes in access to foreign information have been occurring in the context of a broader change in the Soviet communication system--the growth of domestic mass media. This growth involves not only the increased availability of the media, but also a major effort to lighten and diversify their contents and to make them more timely. Soviet domestic media today report and comment on most major events in the world almost immediately.

With such changes underway, participation in the Soviet mass media is growing. As the mass media become an increasingly important institution in Soviet life, they are taking over many of the functions of social mobilization and control previously performed by primary organiztions, such as the family and the local Party organization. (Soviet leaders today face the question of how far they should allow this process to go.) Many Westerners are predicting that in the long run Russia will achieve a more modern type of society with forms of social coordination that rely more heavily on freer mass media instead of Party control.[22]

Whatever the course of evolution of Soviet society, we cannot assume that the same pattern of communications that existed in the past will continue to exist, say, ten years from now. Fundamental transformations in Soviet communication channels are changing the balance of information in Soviet message flows. A simulation model of Soviet mass media communication can be used to make longitudinal comparisons in order to specify the nature and extent of the changes which have already occurred. Questions which might be investigated in this fashion include the following:

--How do patterns of information diffusion differ from items which are given full coverage by the domestic media and for items which are suppressed by these media, and how are these differences changing over time with the increased foreign infusion of messages? Comparisons might be made across the Stalin, post-Stalin, post-jamming, and de-Stalinization periods.

--How different are the exposure patterns of rural and urban people, educated and uneducated people, and are these differences increasing or decreasing over time?

--Which media are crucial in determining the nature of the flow of messages to the Russian people, what is the relative strength of their influence, and how is it changing with the advent of new media and the growth of older ones?

--How do patterns of message flow differe in crisis and non-crisis situations, in different kinds of crises, and how are these differences evolving under the impact of increasingly sophisticated Soviet techniques for crisis management?[23]

Effective longitudinal comparisons of this sort would have to be based on simulations of Soviet message flows during periods sufficiently removed in time to make change observable. Before undertaking such a task, however, we must first test the reasonableness of simulation outcomes. This requires that we control for the process of media development by analyzing exposure histories simulated for contemporaneous but otherwise different classes of media content. Such is our objective in simulating Soviet message flows during two crisis periods, one in 1962 and the other in 1963.

A simulation model of Soviet mass media communication can also be used to predict how information might diffuse in the Soviet Union in a variety of future circumstances, under the impact of the continuing growth of modern communication patterns. Long-range policy planners concerned with the Soviet Union should be particularly interested in this use of simulation.[24] In the short run, simulation can be used to update and broaden the data base so essential for effective decision-making in crises.[25] This is particularly important when communication strategy is being employed to enforce a posture of military deterrence, as is often the case in Soviet-American confrontations.[*1] Simulation can be used, in this regard, to

---

[*1] The events of the Cuban missile crisis in 1962 demonstrated the key role which communication can play in

answer the following kinds of questions:

--How long would it take for explanatory broadcasts from the United States about a changed weapon deployment to reach 10%, 25%, 50%, 75% of the Soviet population under varying conditions, such as with jamming, without jamming, with a Presidential statement, without one, etc.?[26]

--Could movement of U.S. troops to West German bases in easy airlift distance of Czechoslovakia become widely known among elite circles in the Soviet Union and not among the broader Soviet masses if referred to only in Party publications?[27]

--During crises in which the Soviets stopped civil radio, how effective would be the other channels of communication that continued to exist between the government and the population? Between the West and the Soviet population?[28]

--In a local crisis similar in character to the Berlin crisis, what channels and facilities exist whereby American or NATO communicators could convey to the Soviet population an awareness that the danger of war was imminent? How rapidly and widely could alarming news of Soviet troop movements and other provocative acts be disseminated to the Soviet population by foreign radio broadcasts?[29]

In order to improve Western ability to communicate with the Soviet Union--under both crisis and normal conditions--we must first develop a clearer understanding of

---

the course of international controversies and in the avoidance of war. The heads of state of the Soviet Union and the United States exchanged messages at that time through the mass media because the channels of official communication had become overloaded. In other kinds of crises, it might be equally important for the American president to communicate directly with the Russian people as well as with Soviet leaders.

the Soviet communication system. By reconstructing the way messages have actually flowed from the mass media to the Soviet population in a variety of past situations, we hope to enhance this understanding. Simulating Soviet exposure to events surrounding the Cuban missile crisis and President Kennedy's assassination is a first step in this direction.

Having discussed the significance of the problems to which this thesis is addressed we turn now to a review of the pertinent literature. This thesis deals with three distinct topics--computer simulation, the Soviet mass media, and crisis communication--so we shall take up the relevant literature on each in turn.

Review of the Literature

Computer simulation in the behavioral sciences

The past decade has seen the rapid development of computer simulation as a behavioral science technique. The impetus for this development stems from the unique adaptability of computers to the logical requirements for understanding behavioral systems. Behavioral processes are often complicated and highly repetitive, and, frequently, vast amounts of data are required in order to construct and test theories about such processes. Modern computers provide the flexible control options, the high speed computational facility, and the memory storage capacity to deal with these problems.[30] The fullest study of a behavioral system, or any complex part of that system, requires two complementary activities: a taking apart (analysis) and a putting together (synthesis).[31] In the former case, computers have typically been used for statistical analysis of sample survey data, in order to identify relationships and processes of which the system is composed. In the latter case, computers have been used to play out or simulate the logical consequences of these relationships and processes.

Behavioral science computer simulations are now so many and varied that it is necessary to place our own effort in perspective. We shall attempt to do so by surveying a variety of applications of this technique within the behavioral sciences.[32] The purpose of the survey will be (1) to construct and to illustrate a typology which reflects fundamental distinctions among kinds of computer simulations, and (2) to locate the Comcom model within this typology.

One basic distinction among types of simulations is between mathematical or computer simulations (often referred to as all-machine simulations) and human simulations (often called games). In the following survey we shall not consider human games[33] but shall confine our attention to computer-operated simulation models, i.e., to all-machine simulations.[34]

A typology of behavioral science computer simulations can be developed by examining, _seratim_, the application of this technique to increasingly complex behavioral systems--idealized intelligences, abstract organizations, individuals, and masses. There are two reasons for this approach: (1) Any behavioral system is analyzable into two components--_structure_ and _process_. Computer simulations can be differentiated and classified according to the types of structures and processes which they have modelled, and simulations of particular behavioral systems can be used to illustrate these various classifications.[35]

(2) The historical extension of computer simulation applications has roughly followed a progression from simpler to more complex organisms, i.e., from more structured to less structured behavioral contexts. Accordingly, the logical development of a typology of computer simulations should proceed stepwise, from simpler to more complex applications of the technique.[36]

Simulations of idealized intelligences

A major thrust of the discipline of cybernetics has been the specification of ways of handling information which are common to both human beings and computers. Some of the basic information processing operations which these two entities share are:

--remembering (storing) or forgetting (erasing) symbols;

--associating symbols (organizing memories);

--communicating internally and externally by reading, writing, and copying symbols;

--comparing symbols, perceiving relationships between them, and acting in response to the outcome of such comparisons and perceptions.[37]

A number of early computer simulations of logical thought processes utilized this human-computer analogy and a programming language, IPLV, developed by the RAND-Carnegie Tech group.[*1] Programs written in this language were able to process complex information through the use of hierarchical list structures. Some thought processes that were simulated in this manner included proving theories in symbolic logic[38] and geometry,[39] verbal rote memorization,[40] behavior in a binary choice situation,[41] human concept formation,[42] verbal communication,[43] and playing chess[44] and checkers.[45] These pioneering efforts were rapidly followed by the development of more general models in which behavioral processes were largely abstracted from the particular contexts where they had first been studied.

[*1]Allen Newell, Fred M. Tonge, Edward A. Feigenbaum, Bert F. Green, Jr., and George A. Mealy, Information Processing Language-V Manual (2d ed.; Englewood Cliffs: Prentice-Hall, 1964). IPLV is one of several list-processing languages, all of which are characterized by "dynamic storage allocation." This feature allows programmers to structure data in lists (descriptive and associative) which can vary in length during the course of program execution. This kind of format is often required for simulations of individual choice behavior (problem-solving, decision-making, sociometric) when the maximum number of possible choices is either not known in advance or varies over a simulation run. Dynamic storage allocation is more efficient than storing an entire choice universe in a huge matrix (which, in some cases, may be impossible anyway).

When the data for a simulation falls entirely into the form of arrays whose maximum size is known in advance, algebraic compiler languages such as FORTRAN, MAD, or ALGOL have generally been used. It is much easier to write extensive programs in either algebraic compiler or list processing language rather than in machine code (FAP, e.g.), although a program written directly in the latter will usually consume less running time.

Computer simulations at this more general level included models of logical processes such as trust investment,[46] problem-solving,[47] musical composition,[48] and assembly line balancing,[49] and models of nonrational processes such as conflict-ridden thinking.[50] Most of these simulations were also programmed in IPLV; a computer study of a nonrational thought process programmed in a different language was Abelson's simulation of affect-laden congition.[51]

It should be noted that in none of the foregoing simulations did the entities symbolize human beings. These simulations were not intended to imitate the behavior of real individuals, but rather of idealized (artificial) intelligences. Requiring little or no data, they were used to follow out theoretical consequences by linking together cognitive processes postulated for an idealized system or class of systems. Thus, they serve to illustrate one half of a fundamental dichotomy among behavioral computer simulations--theoretical simulations. Examples of applied simulations--the other half of the dichotomy--are more frequent among computer studies of mass behavior, so we reserve further comment on them for the appropriate section.

Sources of data.--There are at least three ways in which data may enter into computer simulations: as the basis for models, as inputs for simulation runs, and as validation criteria.[52] For individual cognitive processes, special-purpose models have been based on protocols of subjects' verbalized thought processes and, of course, on introspection. More general models have been developed from case studies. The inputs for these simulation runs are usually derived from the structure of a particular problem context. Four validation methods have been utilized:[53] response matching; sequential dependency tests; Turing Tests (these three methods are based on individual protocols, real and simulated); and experimental tests of simulated predictions.

In Figure 1.1 we illustrate the typology constructed so far, as illustrated by computer simulations of idealized intelligences.[54]

Simulations of abstract organizations

Simulations of organizational behavior share an important feature with models of indiviual cognitive processes. Both simulate the behavior of abstract systems rather than real individuals. Cognitive models concentrate on problem-solving in the formally unambiguous context of logic; they simulate idealized thought processes. Models of the firm focus on decision-making in the clearly defined

<u>Behavioral system</u>:	$\boxed{\text{INTELLIGENCE}}$	<u>Applicability</u>:
Structures modelled	1. cognitive	Theoretical (general)
	2. personality	1. artificial intelligence
Processes simulated	1. problem-solving	Applied (specific)
	2. decision-making	
	3. communication	
	4. learning	
	5. emotional	
<u>Sources of data</u>:		
Model	1. individual protocols	
	2. introspection	
	3. information theory	
Inputs	1. problem contexts	
Validation	1. real and simulated protocols	
	2. laboratory experiments	
<u>Major fields</u>:		
Artificial intelligence		

Fig. 1.1--Computer simulations of idealized intelligences

context of micro-economics; they simulate abstract allocation procedures.[*1] Thus, behavioral simulations of the firm are also theoretical in nature.

Models of organizational decision-making--developed by Cyert, March, and others--focus on the process of setting price and output levels.[55] Various intra-organizational departments revise their goals (aspiration levels) upward when they are exceeded and downward when they cannot be attained. Problems are dealt with only as they appear and conflicting goals are attended to sequentially. These postulated processes have been termed "satisficing" behavior.[*2] Theories of organizational decision-making have frequently been simulated with the help of special-purpose programming languages such as IPLV (see n. *1, p. 37 above), Simscript,[56] GPSS II,[57] and SLIP.[58] For particular types of problems, these languages make more efficient use of computer time than do algebraic compilers such as FORTRAN and MAD.

[*1] Cognitive models and models of the firm postulate adaptive processes which make theoretical outcomes uncertain, despite the formal specificity of their logic or economic "sets." In the one case, these processes are subsumed under learning behavior, and in the other case under satisficing behavior. Both are mechanisms for narrowing a choice/attention matrix for problem-solving/decision-making.

[*2] This type of behavior was first observed in studies of cognitive activity and was first conceptualized in the models of artificial intelligence discussed in the previous section.

Other types of computer simulations have also been performed in organizational settings (business, industrial, and military). They include some of the tactical studies of classical operations research,[59] such as aerial bombardment, tank or naval maneuvering, queueing theory, traffic flow, and job shop scheduling. These _normative_ computer studies are used to identify strategies for optimizing the performance of man-machine work and weapon systems.[60] They differ from _descriptive_ computer simulations, most of which are used to describe processes and/or predict outcomes that characterize the regular functioning of all-man behavioral systems.

Sources of data.--Simulation models of large firms making decisions in imperfect markets have been based on case studies of various organizations and on selected features of information theory. Inputs generally consist of postulated economic or market contexts and organizational objectives. Case studies and natural experiments have been used for validation purposes. In Figure 1.2 we portray computer simulations of abstract organizations in the framework of our partially developed typology.

<u>Behavioral system</u>:	ORGANIZATION	<u>Applicability</u>:
Structures modelled	1. organizational	General (theoretical)
Processes simulated	1. decision-making	1. behavioral theory of the firm
		Specific (applied)
<u>Sources of data</u>:		
Model	1. case studies	
	2. information theory	
	3. micro-economics	
Inputs	1. postulated markets	
	2. postulated goals	
Validation	1. case studies	
	2. natural experiments	
<u>Major fields</u>:		
Behavioral theory of the firm		

Fig. 1.2--Computer simulations of abstract organizations

Simulations of individual behavior

In this and the following section we discuss examples of "social simulation," i.e., computer simulations in which some of the entities represent human beings and the programs express behavioral science propositions about how these persons act and interact.[61]

Computer simulations of individual behavior focus on single individuals or on groups of individuals. Simulations of individual behavior--for purposes of theory development and verification--include Cobly's study of psycho-therapy,[62] a computer simulation of response to frustration,[63] and a simulation study of socialization.[64] Theoretical simulations of group behavior include Coleman's study of triadic interactions,[65] Gullahorn's simulation of Homan's interaction theory,[66] and a computer study of the response of workers to management incentive systems.[67]

Information processing theories of cognition and organizational decision-making share a basic attribute with computer programs. The latter are organized sequentially under the control of a main program or "executive." Information theory similarly postulates a centralized control mechanism in cognitive structures, and this makes it rather natural to map cognitive models into computer memories. The mapping is more difficult, however, with models of social behavior because groups of individuals can have many and shifting centers of initiative. This means that simulation models of social behavior cannot locate program control in a single individual-symbolizing entity. Two approaches have emerged from the various attempts to compensate for this basic difference between social processes and computer programs. One has been described as the aggregative and the other as the systemic approach.*1 Aggregative simulations emphasize the qualitative details of several interacting persons. Highly articulated processes are postulated as operative within individuals whose actions and interactions are aggregated to determine group behavior. While these "micro-processes" may operate within larger "macro-processes," program control alternates among individuals. (In simulations of cognitive activity and organizational decision-making, program control resides permanently in an external monitor.)

An example of the aggregative approach is Pool's and Kessler's simulation of the interactions among national decision-makers confronting each other in a crisis.[68] Each decision-maker receives and incorporates information

---

*1 Abelson, "Simulation of Social Behavior." This distinction has been drawn by many others. See, e.g., Coleman, "Social Simulation," p. 9. The difference between aggregative and systemic simulations is often described in terms of "micro" versus "macro" processes. In such cases, the comparison is made between simulations based on processes at the individual level and simulations based on processes at the level of the system itself.

about his environment, in ways which are dependent on his own cognitive structure and on sociopsychological processes. Decision makers in turn output new information from their cognitive structures into the environment. Other examples of the aggregative approach include a simulation of the process by which children are socialized,[69] a study of the effects of leadership,[70] and a simulated case of restriction-of-output.[71]

Simulations of the behavior of individuals within relatively small social units (individuals, dyads, triads, families, work groups, etc.) are generally aggregative. As the number of individuals in a simulation becomes larger, however, it grows increasingly difficult to provide each person with detailed socio-psychological processes. Not only does the simulation become time-consuming and cumbersome, but the complexities of formulating and phasing the various micro-processes within each macro-process rapidly multiply. For this reason systemic simulations are generally used to characterize large social systems. Systemic simulations usually express statistical models of social systems (although the cognitive and decision-making models discussed earlier are also systemic). Micro-processes acting within individuals are either extremly crude or are absent altogether. Typically, macro-processes or universal forces act on or between individuals, on groups of individuals, or on the system as a whole. The implication in such models is that all individuals are simultaneoulsy subjected to each macro-process. (In actuality, computers cannot perform "parallel processing," so the effect of simultaneity is achieved by "serial processing"; each individual in turn is subjected to the macro-process.) Executive control resides permanently in an external monitor--a main program or a "chain" of main programs--which acts on a passive system.

Examples of the systemic approach are simulations of reference group behavior by Coleman and Waldorf[72] and, generally speaking, simulations of mathematical models which cannot be solved analytically. The systemic or macro-analytic approach is more characteristic of simulations of large social aggregates, so we reserve further illustrative examples for the section on mass behavioral simulations.

Sources of data.--Parameters for simulations of individual behavior have typically been estimated from surveys of social groups (high school students, e.g.) and case studies of interacting individuals (elite decision-makers, e.g.). Inputs generally consist of postulated dynamic processes (e.g., changes over time in attitudes, attention, friendships, etc.). Validation may involve the comparison of simulated distributions of summary properties (over individuals or groups) with their theoretical or empirical

Behavioral system:	INDIVIDUAL	Applicability	Processes
		Theoretical (general)	Aggregative (individual-based)
Structures modelled	1. influence	1. psycho-therapy	1. elite communications
	2. power	2. socialization	2. socialization
	3. social	3. social interaction	3. reference group behavior
	4. attitude	4. reference group behavior	
Processes simulated	1. psycho-therapy	Applied (specific)	Systemic (system-based)
	2. leadership		1. psycho-therapy
	3. social interaction		2. reference group behavior
	4. socialization		
	5. elite communication		
Sources of data:			
Model	1. surveys		
	2. case studies		
Inputs	1. theory		
Validation	1. **comparison of simulated with theoretical and/or experimental processes and outcomes**		
Major fields			
Theory of neuroses			
Reference group theory			
Socialization			
Elite communication			

Fig. 1.3--Computer simulations of individual behavior

counterparts.

In Figure 1.3 we present an expanded typology, as illustrated by computer simulations of individual behavior.

Simmulations of mass behavior

In the preceding section we discussed social simulations which focus on individuals or groups. We turn now to some examples of social simulations which focus on large systems--i.e., simulations of demographic, social, economic, electoral and communications systems.[74] Before doing so, however, it will be useful to add another dimension to our present typology.

Simulations that are carried out for purposes of applied research are generally data-rich and theory-poor, i.e., they process a large body of data according to a relatively small set of propositions.[75] Their function is to provide specific answers--in many cases quantitative--to question about the behavior of concrete systems. They often require the estimation of values for a great number of input parameters, and, when they are used to provide precise predictions of system outputs, this estimation procedure becomes critical. In short, applied simulations are typically <u>prognostic</u>, i.e., they simulate outcomes (purchase decisions, votes, exposures, etc.)[76] On the other hand, most simulations that are carried out for purposes of developing and testing theories are theory-rich and data-poor. They focus on a well-defined, highly complex body of propositions, and the relatively few parameter estimates that they require can be "guestimated." In short, theoretical simulations are typically <u>process</u> simulations.

The computer simulations of artificial intelligence and abstract organizations mentioned earlier are, for the most part, process simulations. The Crisiscom study of elite communication,[68] described above, also is a process simulation. Parameter values for the elite communicators are set arbitrarily, and the simulation focuses on a number of sociopsychological processes rather than on measures of real world parameter values.

Computer studies of large systems generally simulate aggregatively observable behavior, as for example population growth,[77] the diffusion of innovations,[78,79] market response,[80] voting,[81,82,83,84,85] and mass media exposure.[86,87] A theoretical, process-oriented simulation of mass behavior is McPhee's simulation of voting systems.[82] Each sample voter is characterized by party disposition, socio-economic group memberships, sociometric ties with other sample voters, and past voting history. Voter preferences are determined by combinations of stimuli from and dispositions for a party, mediated by these voter attributes. The outputs of the model can include information about the effect of the processes of the model on individual voters as well as data on the outcome of the election.

Prognostic simulations of mass behavior, for purposes of applied research, includes Beshers' study of population growth,[77] Amstutz's simulation model of market response,[80] a computer study of voting in Presidential elections by Pool, Abelson, and Popkin,[85] and computer simulations of mass media exposure carried out by the Simulmatics Corporation[86] and by the author and his colleagues at M.I.T.[87] Beshers' simulation projects population growth by taking into account fertility limits, family planning, and changes over time in population characteristics affecting these factors. Amstutz's model of market response synthesizes the behavior of retailers, distributors, salesmen, consumers and industrial purchasers to predict brand shares resulting from different marketing strategies. In their simulations of the 1960 and 1964 Presidential elections, Pool, Abelson and Popkin used a model which estimated the summary impact of specific campaign issues on particular blocs of voters. These impacts were aggregated over all voter types and the total gain or loss for each candidate was predicted assuming simplified one- or two-issue campaigns.

Both the Comcom model (which we shall discuss in detail in the next two chapters) and the Media-Mix are simulation models of mass media exposure. The Media-Mix has been used to represent the flow of messages through the mass media to the American population. The Comcom model--a more sophisticated version of the Media Mix--has been used by the author to represent the flow of messages through the mass media to the population of the Soviet Union. Both simulations have macro-analytic operating characteristics (see p. 45 above), as do all the mass behavioral simulations discussed in this section. In every time period, a main program cycles through each individual, pairing him with each message event occurring in a medium. The main program accesses subroutines (1) to look up or calculate factors effecting message exposure probabilities and (2) to construct a historical record (based on these probabilities) of the populations' exposure to the message flow. The Media-Mix and the Comcom model are both prognostic simulations. Individuals are not endowed with the detailed sociopsychological processes that actually determine their media behavior. Instead, aggregate exposure histories are developed using empirical estimates of audience parameters and message formats.

There are, of course, simulations of mass behavior which depart from the usual association of theory with process and applications with prognoses. Stokes and Iverson's simulation of election vote fluctuations,[81] which postulates processes and outcomes at the level of the system itself, is a theory-based, prognostic simulation. Coleman's voting simulation[83] and a computer study of community referendum controversies by Abelson and Bernstein[84] are both examples of process simulations that were used for purposes of applied research. Coleman's model of voting (which, unlike McPhee's, was designed from the start to simulate a single campaign) specifies detailed political, psychological, social and mass media phenomena. Voter preferences for candidates are affected by stimuli from the mass media, discussions with associates, and issue orientations. Abelson's and Bernstein's model simulates the results of a referendum to fluoridate the water system in a given community, under varying campaign strategies. The simulation expresses a number of social and psychological processes involved in a community's response to a fluoridation campaign.

This survey would not be complete without some discussion of one other fundamental distinction among behavioral computer simulations, a distinction which most commonly manifests itself in studies of large social aggregates. Any model of behavior, in order to be simulable, must represent a closed system, i.e., there must be no undefined circumstances in the theoretical construct. The model-builder generally meets this requirement in one of two ways:

--He chooses a simple, deterministic model, which excludes complicated variables. The model is generally constructed in a form so that additional variables can be added later, as needed. No matter how many times the simulation is run, if the inputs and the initial conditions are the same, the outcomes will be the same.

--He chooses a complicated, stochastic model, which summarizes ignorance about other variables by including probabilistic events. The model selectively allows a degree of randomness to enter the sequence of events by using Monte Carlo techniques.*1 Each time the simulation is run, with the same inputs and initial conditions, the outcomes will vary.

Examples of stochastic simulations include studies of the diffusion of innovations by Hägerstrand[78] and Pitts[79] and a study of social interaction by Rainio.[88]

---

*1 In a computer simulation, the program embodies a set of rules that specify when and how to change certain stored symbols which represent real-world entities. A deterministic transformation rule states the following: "If real-world A changes to real-world B under real-world condition X, then change stored symbol A' to stored symbol B', whenever X' is found in storage." A stochastic transformation rule states the following: "If real-world A changes to real-world B under real-world condition X, with a probability of p, then whenever X' is found in storage, change stored symbol A' to stored symbol B' by a Monte Carlo process on p'." In a Monte Carlo process, a random-number generator is used. If the number generated lies between 0 and p', A' changes to B'. If the number lies between p' and 1.0, it does not. Simulations with Monte Carlo routines are generally stochastic and simulations without them are generally deterministic.

Stokes and Iverson's simulation of election vote fluctuations applies a stochastic technique at the level of the electoral system, and the Media-Mix simulation applies Monte Carlo techniques at the individual level. Media-Mix outputs consist of tabulations and statistical analyses of the stochastic outcomes (exposures or non-exposures) which occur at each opportunity for exposure in the program. The Comcom simulation is also stochastic. Although it uses no Monte Carlo routines, its outputs consist of tabulations and statistical analyses of expected value outcomes (average numbers of exposures and persons exposed) which result from one complete run of the program.[*1]

Sources of data.--Process simulations of social behavior are only feasible when the data which can be obtained relate to individuals rather than aggregates (such as voter types or audience types). One must be able to identify the details of the social and communication networks in which the individuals are located. Thus, process simulations of mass behavior usually require special-purpose studies,

---

[*1]Stochastic computer techniques are used in some of the Comcom simulation programs, in order to map the structure of a mass media system into the computer's memory. However, no Monte Carlo processes are used in the dynamic simulation programs, i.e., in the message exposure routines, and it is these routines which produce the final simulation outputs.

as for example panel and sociometric surveys and systematic surveys of the mass media. When process simulations are used to predict the behavior of a real population, these surveys provide information on the initial values of the variables in the model. They also provide validational data on an actual stream of behavior (which can be compared with the simulation output) and on the processes that are postulated by the model.

Parameter values for prognostic simulation models are usually derived from secondary analyses of large compilations of data, such as opinion surveys, census data, time-budget studies, and audience ratings. Validation methods for prognostic simulations generally involve the analysis of distributions of properties over individual units. When the number of simulated units (individuals, voting blocs, audience types) is sufficiently large, statistical distributions of simulated properties can be calculated and compared with their empirical counterparts.

In Figure 1.4 we illustrate the final two dimensions of our typology with computer simulations of mass behavior, and in Figure 1.5 we use the completed typology to cross-classify some of the simulations discussed in this review. Having thus outlined the fundamental distinctions among different kinds of computer simulations, and having characterized the Comcom simulation model in terms of these distinctions, we turn next to a description of the system which the Comcom model was designed to simulate--the Soviet mass media system.

Behavioral system:	SOCIAL SYSTEM	Applicability	Processes
		Theoretical (general)	Aggregative (individual-based)
Structures modelled	1. demographic 2. social 3. market 4. electoral 5. mass media	Applied (specific)	Systemic (system-based)
Processes simulated	1. population growth 2. diffusion 3. consumer choice 4. voting 5. mass media exposure		
Sources of data		Focus	Outcomes
Model	1. Special-purpose studies 2. Archives	Processes 1. Simulations of the diffusion of innovations	Deterministic 1. Beshers' model of population growth. 2. Amstutz's marketing simulation
Inputs	1. Postulated dynamics 2. "Campaign" data	Prognoses (outcomers) 1. Comcom and Media-Mix simulations 2. Stokes' & Iverson's simulation of presidential vote fluctuations 3. Beshers' model of population growth 4. Amstutz's marketing simulation	Stochastic 1. Simulations of the diffusion of innovations 2. Comcom and Media-Mix simulations 3. Stokes' and Iverson's simulation of presidential vote fluctuations
Validation	1. Comparisons of simulated with postulated or empirical processes and outcomes		
Major fields			
Demography	Political Science		
Agricultural development	Public health		
Marketing management	Mass communication		

Fig. 1.4--Computer simulations of mass behavior

		Systemic		Aggregative	
		Theoretical	Applied	Theoretical	Applied
Deterministic	Process	McPhee's model of childhood socialization, and his "campaign simulator" Newell's, Simon's and Shaw's artificial intelligence models Cyert's & March's simulations of organizationa decision-making	Coleman's voting simulation Abelson's and Bernstein's simulation of community referenda	Pool's & Kessler's simulation of elite communications Simulations of social interactions by Coleman & Gullahorn Coleman's simulation of reference group behavior	
	Prognostic		Pool's, Abelson's & Popkin's simulation of the 1960 & 1964 presidential election Beshers' model of population growth Amstutz's marketing simulation		
Stochastic	Process	Simulations of the diffusion of innovations			
	Prognostic	Stokes' and Iverson's simulation of presidential vote fluctuations	Media-Mix simulation Comcom simulation		

Fig. 1.5--A typology of behavioral science computer simulations

The Soviet mass media system

We undertake the following discussion of the Soviet mass media system with several purposes in mind. First, we seek to acknowledge the work done by others, work on which our own effort has in large measure depended. Our second objective is to paint a broad-brush picture of the Soviet mass media system by emphasizing features which stand out in bold relief. These are precisely the features which must be accounted for in a "first-cut" simulation of Soviet media exposure if the simulation is to have any chance of being realistic. By drawing a profile of the Soviet mass media system in terms of the literature on that system we hope

--to convince the reader that, on the fact of it, sufficient data is available to conduct an experimental simulation;

--to lay the groundwork for a more extended discussion of the choices we have made with regard to the media structure, the message scenarios, and the audience parameter values input to the simulation;

--to introduce general guidelines and criteria for assessing the reasonableness of the simulation outputs.

The amount of existing literature on the Soviet mass media system is comparatively small. We shall first discuss some background readings which, while they do not bear directly on the quantitative estimation of exposure patterns, are important to a balanced picture of Soviet mass media communication. These readings focus on the social functions served by the Soviet media and on their control by the political elite. We shall then review material directly relevant to the problem at hand, viz., literature on the structure and distribution of the media, on the timing and format of the messages they convey, and on the nature of their audiences.

Social functions

Soviet media development and the ways in which the media have come to be used by the Soviet political elite reflect some basic tenets of Communist doctrine. These have been codified by Inkeles, Bauer and others, and may be summarized as follows:

--Media provide both an activity around which to build organizations and an instrument for central direction of these organizations;

--Media provide an important means for inducing characterological changes, both in the communicators (by enforcing verbal discipline) and in the audience (when combined with direct personal contact);

--The legitimacy of a medium depends on the functional value of its existence as an institution and of the statements in it.[89]

A fundamental part of Lenin's revolutionary strategy was the establishment and coordination of local organizations by means of communications activities. He once wrote, "To train a network of agents for the rigid and correct distribution of literature, leaflets, proclamations, etc., is to perform the greater half of the work of preparation for an eventual demonstration, uprising."[90] In his famous pamphlet on tactics he defended the establishment of a national newspaper on the grounds of its potential role in building and directing these organizations:

> . . . a network of agents that would automatically be created in the course of establishing and distributing a common newspaper would . . . carry on the regular work that would guarantee the highest probability of success in the event of rebellion. . . . It is precisely such work that would train all local organizations to respond simulataneously to the same political questions, incidents and events that excite the whole of Russia, to react to these events in the most vigorous, most uniform and most expedient manner possible . . . such work would train all revolutionary organizations all over Russia to maintain the most continuous and at the same time the most secret contact with each other, which will create real Party unity, . . .[91]

In the years since the October Revolution, Lenin's initial conception of the social role of communication has shaped the development of Soviet foreign propaganda. The Soviets have utilized communication activities to build and direct revolutionary organizations abroad. Students of their foreign propaganda strategy such as Lasswell and Selznick have observed in it the organizational imprint of Leninist theory; Barghoorn has attributed the congruence between Soviet policy and foreign propaganda to their centralized control of that activity.*[1] Lenin's ideas have also profoundly influenced the development of Soviet domestic media. Perhaps the most convincing and well-documented account of this influence is Inkeles' classic study, in which he describes how the means of public communication have been elaborated and extended to the limits of the nation's physical resources, and how the "agitprop

---

*[1]Harold D. Lasswell discusses this aspect of Soviet propaganda in "The Strategy of Soviet Propaganda," The Process and Effects of Mass Communication, ed. by Wilbur Schramm (Urbana: University of Illinois Press, 1955), pp. 545-46:

> "The secret channel can be . . . entrusted with the mission of controlling the policy of organizations which are nominally independent of party control. Hence the vast network of . . . organizations which are used by the party to permeate every national community. . . . Through these organizational networks a great number of special environments are made available for the restamping of minds, and for expanding the material facilities within reach of the Russian leadership."

Philip Selznick, commenting on the same subject in The Organizational Weapon: A Study of Bolshevik Strategy and Tactics (New York: McGraw-Hill, 1952), p. 7, says the following:

> "Bolshevism has never been content to propagandize for its program; it has sought directly to control the arena of conflict. . . . This has required . . . the development of an organizational strategy to maximize accessibility and neutralize opposition."

Barghoorn, discussing the techniques used by the Soviets in their foreign propaganda activities, describes how they have combined face-to-face communication with centralized control to attract the attention of, and exercise persuasion on, a number of diverse audiences (see Frederick C. Barghoorn, Soviet Foreign Propaganda [Princeton: Princeton University Press, 1964]).

units"--located high in the Party structure--have come to embrace every form of organized activity that might possibly affect public opinion.*[1]

The importance of using the media for characterological change arose from Lenin's conviction that the Party would require various degrees of mass support at different stages of the revolutionary struggle, that this support would depend upon the emergence of class consciousness among the "toiling masses," and that the media (linked with personal contact) could play a vital role in evoking and sustaining this consciousness.*[2] Both Lenin and Stalin

---

*[1]Alex Inkeles, Public Opinion in Soviet Russia (Cambridge: Harvard University Press, 1950):

> "Agitprop" is a mnemonic for the "Department of Agitation and Propaganda." G. B. Plekhanov was the first to differentiate between agitation and propaganda in Sochmenuya (Moscow: Gosudarstvennoe Izdatel'stvo, 1927). He defines an agitator as one who presents one or a few ideas to a mass of people and a propagandist as one who presents many ideas to one or a few people. Soviet newspaper editorials and long analytical articles probably function as propaganda vehicles, attracting a relatively small but elite audience interested in, and capable of absorbing, their rather more abstract material. Factory and wall newspapers and, of course, the network of oral agitators are examples of communication channels that serve more agitational functions, conveying a relatively small number of concrete, action-oriented items to mass audiences. Similar functional distinctions also prevail within and across the electronic media.

*[2]Lenin argued in Left Wing Communism, An Infantile Disorder (New York: International Publishers, 1940) that

attributed to the Party the responsibility of teacher and guide in this regard, and this responsibility led the Party to develop personalized channels of communication which include an extensive network of oral agitators. It has also influenced the operation of the Party's agitprop units which not only interpret and disseminate Central Committee decisions affecting mass communications but also report to the Central Committee on the state of mass attitudes and feelings. The assumed critical importance of these attitudes compels the Party to screen and carefully control the messages and interpretations that reach the public through the media. This has resulted in two important characteristics of Soviet mass media communication: (1) a multiplicity of media tailored to specific audiences, each carrying themes adapted to the vocabulary, experiences, and aspirations of their audiences; (2) the banning of all oppositional themes from message flows to the public.

The main purpose and effect of Soviet censorship has been to prevent the formation of public opinion, except for the official opinion imposed on the public by the Party monopoly of mass communications media.[92] This state of

---

it was only by participating in action for immediate goals that the masses would have their attitudes transformed. The role of the media in evoking social consciousness was to organize groups of people for, and exhort them to engage in, this activity.

affairs clearly reflects the Communist view that the media's social function is to articulate what public opinion ought to be or, in other words, to express only statements which (the Party decides) will advance the system. The Soviet media, unlike their Western counterparts, thus serve as a guide to "correct" positions on issues rather than as a resource to be drawn on in formulating opinions.[93]

From what we have said so far, it can be seen that the influence of Communist doctrine on Soviet media development has manifested itself in three forms: the media are an important adjunct of the ubiquitous Party organization; they exercise a continual and consistent influence on character formation among the Soviet masses; and they are used to saturate public message flows with Party-approved themes in order to preempt the formation of dysfunctional public opinion. These communication characteristics are, of course, part of the sociological model of totalitarian systems, a model to which Soviet society conforms in many respects. The U.S.S.R. can equally well be viewed, however, as a developing country and, along some dimensions, as a mature industrial state.[*1] The forces of development and

---

[*1]Alex Inkeles makes this point in "Models and Issues in the Analysis of Soviet Society," Survey, No. 60 (July, 1966), 3-17. He bases his argument on the data from a study he conducted with Raymond A. Bauer, the analysis of which is presented in The Soviet Citizen:

industrialization as well as those of political doctrine are reflected in the configuration of the Soviet mass media system.

In its preoccupation with growth the Soviet Union has had to cope with many of the problems common to developing countries. For example, the organizing function of their media can be viewed not only as an extension of Leninist theory but also as part of the country's effort to construct a flexible administrative system responsive

---

Daily Life in a Totalitarian Society (Cambridge: Harvard University Press, 1959). In this volume the authors demonstrate that social science prognostications about categories of people in Western industrial societies can often be used to predict the attitudes and values of corresponding types of people in the Soviet system.

Two major changes that have occurred in the geographic distribution of the Soviet population since the 1920's--migrations from West to East and from rural to urban areas--are also characteristics which the country shares with other industrializing nations. The impact of these developments on the Soviet population is discussed by Frank Lorimer and John Kantner. See, e.g., Lorimer's article on "Trends in Soviet Population History" and Kantner's article "A Comparison of the Current Population in the USSR and USA," both of which appear in Soviet Society: A Book of Readings, ed. by Alex Inkeles and Kent Geiger (Boston: Houghton-Mifflin, 1961), pp. 12-15 and pp. 15-27. Totalitarian, development and industrial models are not the only ones relevant for an analysis of Soviet society. Daniel Bell describes ten different approaches to the study of the Soviet Union in "Ten Theories in Search of Reality: The Prediction of Soviet Behavior," The End of Ideology; On the Exhaustion of Political Ideas in the Fifties (Glencoe: Free Press, 1960).

to central authority. Their persistent use of the media for character formation and political orientation can partly be understood as a developing country's effort to organize loyalties around a national image and, particularly, to integrate diverse ethnic and religious groups into the national system. Finally, Soviet agitation campaigns--with their hortatory emphasis on "production" --certainly must be considered in the context of an industrializing country's effort to establish distribution and allocation systems that include <u>planning</u> and <u>evaluation</u>.

Insofar as the Soviet Union has become a mature industrial state, neither politics nor development is the sole force operating in the realm of public communication. A large and complex system of mass communications media--not unique to the Soviet Union, but equally characteristic of other industrialized states--is bound to have an effect on Soviet society <u>independently</u> of the political structure and the growth dynamics of the system. Barghoorn and others have concluded, for example, that the more varied content of Soviet communications media after Stalin's death reflects a partial emergence of pluralist tendencies in Soviet political life.[94] According to these writers, the political style and life experiences of the technocrats who have succeeded Stalin impel them to rule more by consensus and less by coercion. As part of this effort, they have had to introduce some freedom of exposition and interpretation into mass communication practices, with the result that the Soviet people now have access to a greater range of official and unofficial information and opinion than ever before. (Some of the more sophisticated Soviet readers have even been able to infer policy differences and power rivalries among top political leaders from oblique references to them appearing in different publications.) Another result of the more flexible communications policy is that, for the first time, influential members of bureaucratic and occupational interest groups have been able to express some of their needs and preferences in communication channels to which they have access. Finally, a significant innovation in post-Stalin communications behavior has been the Soviet leaders' heightened concern for, and more sophisticated awareness of, public opinion. This is reflected in their efforts to utilize opinion polls, surveys and other empirical techniques to analyze group attitudes and behavior.[95]

These, then, are some of the major forces which have shaped the general character and development of Soviet media since the Revolution. We turn now to a discussion of some distinguishing features of Soviet mass media communication--features which must be accounted for in a realistic simulation.

The media

Major outlines of the Soviet media--their structure and distribution patterns--are well documented in a number of primary and secondary sources.[96] We shall briefly describe in this section some of the system's dominant characteristics, relying heavily on two chapters from a Ph.D. thesis by Dr. Rosemarie Sträussnig Rogers[96] and also drawing on a chapter in Barghoorn's country study,[94] two monographs on Soviet radio and television by Durham,[96] and Inkeles' book on Soviet public opinion (see n. *1, p. 63 above).

Penetration.--During the past half century the Soviet newspaper system has expanded enormously. By the early 1960's --our simulation time period--newspaper circulation and the number of newspaper titles had reached an all time high. The country could truly be considered "saturated" with newspapers.[*1] While Soviet radio dates back to the

---

[*1] By this is meant the fact that everyone had physical access to newspapers. Whether and how a literate Soviet person read a newspaper, under these circumstances, depended not on his access but rather on his motivation or interest in the contents of the paper, i.e., on what function the newspaper served for him.

1920's, rapid growth in that medium has occurred chiefly since the Second World War. By the early 1960's Soviet society had been completely penetrated by the radio diffusion network, although some sections of the country still lacked adequate reception facilities.*1 Soviet television broadcasting began in the early 1950's and, a decade later, only about half of the Soviet population lived in areas covered by television centers and relay stations. Many sections of the country still lacked adequate reception facilities.*2 Finally, in addition to the print and electronic media, a nationwide network of oral agitators--usually consisting of about two million

---

*1Even though the total number of both wave <u>and</u> wired radio sets had been increasing faster than the Soviet population since 1955, wave sets were still disproportionately located in urban areas in the early 1960's. Urban and rural areas had, at that time, approximately the same ratios of people per wired set. Rogers points out that the increased number of both wired and wave sets in the countryside meant that a greater number of rural people had regular or at least occasional access to radio in the early 1960's than ever before, while in the cities the increased number of wave sets served more to broaden the program choice of urbanites and--many of the new wave sets being able to receive short wave--to afford them greater access to foreign radio than ever before (see Rogers, "The Soviet Audience," pp. 97-102).

*2Even though the number of television sets had been increasing faster than the Soviet population since 1955, they were still proportionately located in urban areas in the early 1960's. Lack of a television set still constituted an obstacle to exposure for many people, in urban as well as rural areas, although more so in the latter (see Rogers, "The Soviet Audience," p. 102).

persons--was distributed throughout the country, with a slightly higher per capita concentration in urban than in rural areas.*1

---

*1The Soviet use of this oral agitation network is discussed at length by Inkeles in Public Opinion in Soviet Russia. For a more recent discussion of the recruitment, training, organization and uses of agitators see Barghoorn, "The Shaping of Public Opinion," pp. 164-68. For our purposes it suffices to note the following: An agitator's audience usually consisted of a group of workers to whom he had been assigned. Personal oral agitation, according to Barghoorn, reached its peacetime peaks during elections to the Soviet on various administrative levels, when the network increased to more than 3,000,000 agitators. The Soviet press supplied much of the material used by agitators in their work, a traditional form of which included reading from or summarizing newspapers. More recently, this practice has been discouraged.

Comcom respondents mentioned oral agitation meetings as one, though not the main, source of information during most crisis periods or periods of important news. The following table, adapted from Pool's paper, indicates each of the events they mentioned and whether they attended any meeting at the time regarding it:

Year	Event	No. of respondents mentioning it	No. who attended a meeting	Total no. of meetings they attended
1956	Twentieth Congress CPSU de-Stalinization Speech	2	1	1
1956	Hungarian Revolution	3	1	1
1957	Sputnik launching	9	6	15+
1960	U-2 incident	11	10	15+
1961	Berlin wall	11	2	2
*1962	Cuban missile crisis	28	14	18
*1963	Assassination of President Kennedy	30	3	3
1964	Khruhschev's ouster	25	7	17
1965	Vietnam	11	5	5

*(One of the scenarios we wished to simulate.)

(Footnote continued on p. 72.)

Structure.--Soviet newspapers in the early 1960's were published on the central administrative level, on the republic level, and on six regional levels.*1 Newspapers published on the central and republic levels, and on the next two administrative levels, were divided into general papers and specialized papers for particular audiences defined by age, sex, occupation or interest. Pravda (Truth), the most important Soviet newspaper, was published by the Central Committee of the Communist Party, and Izvestia (News), the next most important paper, was published by the Council of Ministers (the government) of the U.S.S.R. Each of the fifteen republics of the U.S.S.R. had a newspaper published jointly by the Central Committee of the Party in the republic and the Council of Ministers of the republican government. These papers were published both

---

Clearly, agitational meetings still played some role in Soviet crisis communication during the two scenarios we wished to simulate. However, it seemed reasonable to assume that the mass media played a far more important role than did the face-to-face machine (see Pool, "Opportunities for Change," pp. 21-22 and 29). For these and other reasons we have included only one "oral agitation" medium in the simulation.

*1 In descending order these levels were the autonomous republic or autonomous oblast; the krai, oblast or okrug; the city; the raion; "House" and Kolkhoz. The krai, the oblast, and the okrug, were administrative territories equivalent to provinces. The raion was an administrative territory equivalent to a district. House organs pertained to newspapers of factories, educational institutions, etc. Kolkhoz newspapers were collective farm newspapers.

in Russian-language editions and in the local languages. Other important central newspapers included the youth paper Komsomolskaya pravda (Komsomol Truth), the trade union paper Trud (Labor), the writers' paper Literaturnaya gazeta (Literary Gazette), the scientific and technical paper Ekonomicheskaya gazeta (Economic Gazette), the rural paper Selskaya zhizn (Country Life), the armed forces paper Krasnaya zvezda (Red Star), and a weekly supplement to Izvestia entitled Nedelya ( ).*1 Important national magazines published in Moscow included the illustrated magazine Ogonyok (Small Fire) and the satirical

---

*1We have not included Pionerskaya pravda (Pioneer Truth) in the simulation because this paper is published for, and read mainly by, members of the All-Union Pioneer Organization, all of whom are under the minimum age group (sixteen) in the simulation population. Other important central newspapers not included in the simulation as individual media, either because of low circulation or little news content, include the railworkers' paper Gudok (Whistle), the trade workers' paper Sovetskaya Torgovlya, the cultural workers' paper Sovietskaya Kultura, and its weekly supplement Sovetskoye Kino, the Teachers' papers Uchitelskaya Gazeta, the medical paper, Meditsinskaya Gazeta, the water transport workers' paper Vodniy Transport, the construction industry paper Stroitelnaya Gazeta, and its semi-monthly supplement Architektura, and the forestry paper Lesnaya Rhomishlennost. All of these papers (and others) were aggregated into two media in the simulation, published two and three times a week, respectively. The all-Union sports paper Sovetskii Sport was excluded from the simulation on the grounds that it most likely would never carry general news items.

magazine Krokodil (Crokodile).[*1] Soviet radio programs originated in the early 1960's on four administrative levels: central radio, republic level radio, wireless broadcasting below the republic level, and the radio diffusion exchanges. The latter mainly supplied systems of wired radio with broadcasts from the central and regional levels.[*2] In the early 1960's central radio broadcast an all-Union program (the First Program), a program designed for the European part of the RSFSR (the Second Program), a cultural program (the Third Program), a program beamed to Central Asia, Siberia and the Soviet Far East (the Fourth Program), and a program of special broadcasts for persons at sea, emigrés, etc. (the Fifth Program). Wireless broadcasting at the regional levels was gathered into zonal networks, all of which received programs from Central Radio in Moscow as well as originating programs of their

---

[*1] Important national magazines published in Moscow that we have not represented as media in the simulation include the Central Committee's theoretical journal Kommunist (Communist), and its organizational journal Partinaya zhizn (Party Life), both of which appear twice a month, and a number of periodicals with specialized interests in such fields as literature, economics, history, philosophy, and the natural sciences, etc.

[*2] With the exception of the RSFSR, "republic level ratio" was aimed primarily at the population of the entire republic. Wireless broadcasting below the republic level included radio in autonomous republics and oblasts and broadcasts for individual krays and oblasts within the republic.

own. The radio diffusion exchanges also originated some programs for their wired broadcast schedules. Soviet television broadcasts during the simulation time period emanated from Moscow (Central Television) and from the capitals of the Union republics and other _krai_ and _oblast_ centers. Central Television was broadcasting three programs at that time and local broadcasts followed a pattern similar to local (wireless) radio broadcasts.[*1]

Functions.--Central newspapers played a leading role among the Soviet print media.[*2] In addition to having a higher

---

[*1]The word "program" is used here in a sense comparable to that of the Western word "station." In the simulation we have included only programs I, II and IV as segments of the radio media, assuming that the cultural program (III) seldom carried news items such as those we are simulating and that the overseas program (V) had a negligible audience in the early 1960's. We have only included programs I and II in the simulation as segments of the television media assuming that program III, added to the broadcast schedule in the fall of 1963, was not yet an important vehicle at the time of the events we are simulating.

[*2]Rogers cites the following figures in support of this statement:

	Total Per Issue Circulation (in thousands)	Average Per Issue Circulation of One Newspaper (in thousands)
Central level	36,821	1,600.9
Regional levels		
Republic	17,441	117.8
Autonomous republic or autonomous _oblast_	2,096	22.1

(Foonote continued on p. 76)

periodicity than newspapers on other administrative levels, they accounted for a major share of the total per issue, average per issue and annual circulation of all newspapers in the U.S.S.R. They served the Party, the Government, and the public organizations as the authoritative channel of communication to the Soviet population and, for this reason, were more likely to contain material of national and international importance than were the press on lower administrative levels. The latter looked to the central press for the general line in Party, Governmental and other matters. Central Radio and Television broadcasts played this same leading role among the Soviet electronic

---

(n. *1 continued from p. 75)

	Total Per Issue Circulation (in thousands)	Average Per issue Circulation of One Newspaper (in thousands)
Krai, oblast, okrug	12,535	49.0
City	4,387	17.4
Raion	10,119	6.1
House organs	4,622	1.8
Kolkhoz newspapers	1,073	.7

(Rogers, "The Soviet Audience," p. 28, citing Pechat' 1965, pp. 74-75.)

media.[*1] They provided not only a model for, but in fact made up part of, the local broadcasts. The evidence also indicates that Soviet republic level print and electronic media were, depending on the language and education of the audience, functionally equivalent to corresponding all-Union media.[*2]

Distribution.--Exposure at places of work, via institutional subscriptions, played a significant role in the pattern of Soviet print media consumption. In the early 1960's approximately 75-85 per cent of the total Soviet newspaper and magazine circulation was sold by subscription (either to individuals or to institutions) and the

---

[*1] On this point we quote Durham:

> "In volume of broadcasting time, Central (Radio) Broadcasting in Moscow holds first place in the country. As the core of the broadcasting system, it prepares broadcasts which form the basis, if not the overwhelming bulk, of broadcasting schedules in localities. . . . The programming of local television is not so dependent in content and thematics on the central television broadcasting apparatus as is the case with radio broadcasting. The Central Television studio is, however, the core of the Soviet television network, both administratively and technically . . ."

(Durham, Radio and Television, pp. 54 and 57.)

[*2] While estimating, for the different Union republics, the ratio of central to regional newspapers available per capita, Rogers noted the following: the less Russian was used in a republic, the more opportunity there was for regional newspapers to be used instead of central newspapers; the more Russian was used, the less opportunity there was for such substitution; and the lower, therefore,

rest by retail outlets. Rogers has estimated that perhaps ten per cent of the total subscription to most Soviet papers was made up of subscriptions by institutions. With regard to the geographic distribution of print media, it seems that newspapers and magazines printed in one republic were distributed for the most part only in that republic. Thus, a resident in a given Soviet republic had access to the central press and the press published in the republic in which he lived but not to the other regional press. The distribution of the electronic media in the early 1960's was characterized by the fact that wave radio sets and television sets were still disproportionately located in urban areas; wired radio sets were about evenly distributed (on a per capita basis) between urban and rural areas.

Foreign radio.--By the early 1960's over a third of the people in the Soviet Union had the physical possibility of listening to foreign radio broadcasts. Chief among the radio stations broadcasting to the Soviet Union from

---

was the number of regional newspapers available per capita. Based on her analysis of circulation and population figures she concluded that most, although not all, of the substitution of central by regional newspapers probably occurred on the republic and autonomous republic levels (see Rogers, "The Soviet Audience," pp. 32-49).

abroad at that time--both in terms of broadcast hours and audience size--were the Voice of America, the British Broadcasting Corporation and Radio Liberty.*1 In 1962-63 VOA was broadcasting six to eight hours a day, in Russian and in three of the basic nationality languages; BBC was broadcasting about three hours a day--in 10, 90 and 110 minute formats; and Radio Liberty was broadcasting twenty-four hours a day--in seventeen languages of the U.S.S.R.--to eight different regions covering a large amount of the country. All three media concentrated the bulk of their broadcasts during the evening and early morning hours. Foreign radio broadcasts formed (along with rumor and personal conversation) an "unofficial" network of communication used by the Soviet people to revise and supplement information they obtained through the official media.*2 Because wave radio sets were still disproportionately concentrated in the urban centers in the early

---

*1Other foreign radio broadcasts that were accessible in the Soviet Union emanated from such stations as Deutsche Welle, Radio Peiping, Voice of Canada, and RTF (French Radio), as well as stations located in Madrid, the Vatican and Tokyo. These broadcasts were not included as media in the simulation because of their small Soviet audiences and the low proportion of total foreign broadcast hours they comprised.

*2Many researchers have observed, in Soviet audience behavior, two reactions to the regime's monopolistic mass communications policy: (1) Soviet citizens attempt to gain information through unofficial communication

1960's, foreign radio broadcasts were accessible to a greater percentage of urban, educated Russians than to others, and probably to a majority of these people. It should be noted also that, among the various foreign media circulating in the Soviet Union in the early 1960's, foreign radio was by far the most effective in bringing in news from the outside world.[*1]

---

channels which exist in spite of official attempts at suppression; (2) Soviet citizens apply interpretive principles to the content of official media, i.e., they read between the lines in efforts to uncover officially-concealed information. Inkeles and Bauer, discussing this dual system of communication in Chapter VII of The Soviet Citizen, include among the official media newspapers, magazines, Soviet radio, books, lectures, agitation meetings, movies, and theatre. Among the unofficial media they list discussion with friends, rumor and foreign radio. (To the list of official media we would, of course, have to add television in the early 1960's.)

[*1]According to a Radio Liberty Committee annual report dated November 30, 1964, the Soviet audience for their broadcasts was composed of young people from the higher socio-economic strata who lived in nearly every part of the country. Barghoorn has described the effectiveness of Voice of America and British Broadcasting Corporation broadcasts to the Soviet Union in Chapter XII of The Soviet Image of the United States (New York: Harcourt Brace, 1950). He recalls the instance in 1948 when Madame Kasenkina leaped to freedom from a window of the Soviet Consulate in New York. News of this event was beamed almost immediately to the U.S.S.R., was reported to have become common knowledge in Moscow within minutes, and was known by people throughout the Soviet Union within forty-eight hours. Pool has claimed that international radio is the most important communication channel by which Western ideas and information enter the Soviet Union (See "Opportunities for Change," p. 5).

The printed word from abroad was increasingly, but still sparsely, available in the Soviet Union during

The messages

Timing.--Periodicity of newspaper publication generally diminished as one went from the central level (where the largest part of the circulation was accounted for by daily newspapers) down the administrative hierarchy, until at the district level the majority of newspapers appeared three times, and at the lower levels once per week. By the early 1960's Central Radio was broadcasting the news almost every hour of the day, the Fourth Program transmitting selected material three hours earlier than it was to be heard on the First and Second Programs because of the time differential in the Far East target area. Central Television, on the other hand, was broadcasting the news only about two or three times a day and daytime television was still a rarity.

Format.--During the time period of interest Russian was essentially the only language used in all-Union newspapers and Central Radio and Television broadcasts. Print and electronic media on the other administrative levels used both Russian and the official language of the republic

---

the early part of this decade, so we have chosen not to include foreign print media (as for example, the magazine Amerika) in the simulation. Nor have we included in the simulation Soviet publications which reprint foreign materials, such as Inostrannaya Literatura (Foreign Literature) and Za Rubezhom (Abroad).

in which the publication or broadcast originated. (In some of the republics several other languages were also used.) Soviet newspapers, like other newspapers, conveyed their material in various formats, such as editorials, short news items, long articles, commentaries, speeches, communiqués, slogans, cartoons, etc. A variety of forms were also used in radio and television news transmissions. Examples were reviews of the press, commentaries, interviews, international surveys, and broadcasts explicitly labeled "news broadcasts." Different forms of news presentation in the Soviet print and electronic media, of course, attracted different types of audiences and characteristically were used to convey different kinds of material.

The audience

Three major types of studies contain findings relevant to a simulation of Soviet audience behavior: American behavioral science research on how the Soviet people use the mass media; time budget studies and opinion polls conducted by the Soviets themselves; studies of audience behavior in countries other than the Soviet Union.[97] (The latter can be used to estimate Soviet audience parameters when directly relevant data is unavailable.) We turn first to an American study of the Soviet Union.

The simulation input required that we estimate a number of parameters of Soviet media use, and we have based our estimates for the most part on

--a secondary analysis, by the author, of data collected under the supervision of Professor Pool for the purposes of the simulation,[98]

--an independent codification and analysis of this data performed by Dr. Rogers, in part for the needs of the simulation,[99] and

--available documentary material on (1) the demographic attributes of the Soviet population and (2) the volume and distribution of the Soviet mass media.[100]

The results of our secondary analysis are presented in Chapters IV and V and much of the documentary material has been summarized above, so here we simply summarize Rogers' findings.

Chapters II, III and VI of Rogers' thesis contain an analysis of Soviet audience behavior identifying the main demographic attributes which the data suggest account for differences in exposure to newspapers, magazines, radio and television. The results of this analysis, briefly stated, are as follows: Data from the Comcom Leisure Study indicate that in the early 1960's exposure to Soviet print media was structured largely along <u>educational</u> and <u>occupational</u> lines. Frequency of exposure to newspapers and magazines and the number and variety of print media titles regularly consumed were found to increase with increasing education and also with occupational standing.*1 There were, however, no observable differences in exposure to newspapers and magazines among urban and rural persons, nor among different age groups in the sample. Men were found to be consistently (though slightly) more exposed to print media than women, but this difference generally worked within the frameowrk of education.*2 Frequency of exposure to radio was about the same in all educational groups, but for television it increased with education. Peak listening times for radio were found to be early morning, mid-day and late afternoon-evening, while the peak television viewing time was during the evening.*3 Most of those who had obtained a newspaper or magazine by subscription or at their place of work turned out to be regular readers of the medium. Group radio listening was found to be of some importance for the less educated and the rural segments of the Soviet population, but of negligible

---

*1Occupational roles, in ascending order, were the following: Housewives, unskilled workers and collective farmers, skilled workers, semi-professionals and white collar employees, students (secondary and higher), and professionals (including artists).

*2For example, highly educated females were found to be more exposed to the media than less educated males.

*3To a large extent this reflects the limits on television programming timeswhich, in the early 1960's, were concentrated for the most part in the evening hours.

proportions among the more urban, more educated strata. Group attendance was considerably less frequent for radio than for television, across all segments of the population. The highly educated and the politically involved were most exposed to authoritative material appearing in the newspapers, with attendance dropping off in the less educated, less politically involved groups.*1 The types of newspaper articles typically read were also found to vary with education and political involvement. There were no major and consistent differences across these two attributes, however, with regard to the types of radio and television programs to which people were exposed. Russian clearly dominated the other fourteen Soviet republic languages in media exposure, and higher education appeared to be positively correlated with exposure to newspapers on higher administrative levels. Finally, magazines more than newspapers were found to be the media of the educational elite, both in terms of numbers reached and the variety of publications to which exposure took place. Television appeared to serve as the chief entertainment medium of the lower educational groups, while the most widespread use of radio was as a news medium.

---

*1"High political involvement" was definitely as membership in the Communist Party or (in the case of non-Party members) membership in occupational roles in which the individual was particularly expected to be a high media consumer.

The foregoing results may be tested against, and in some cases modified according to, the findings contained in another American study and two Soviet sources, viz.,

--the mass communication segment of the Harvard Study of Soviet society,[101]

--a series of time budget studies undertaken in the Soviet Union since the late 1950's,[102] and

--a poll conducted in the Soviet Union by the Public Opinion Institute attached to the newspaper Komsomolskaya pravda.[*1]

The data from the Harvard study refer mainly to a period before the Second World War while the Comcom Leisure Study covered the post-War period. Nevertheless, comparisons between both sets of findings can be used (1) to detect changes in audience behavior between these two periods and (2) to extrapolate features of this behavior which were only observable in the first study. The Komsomolskaya pravda poll investigated, among other things, frequency of attendance to newspapers, magazines, radio and television. Both of the samples on which this poll was based were much

---

[*1] B. Grushin, "Kak vy provoditye svobodnoye vremya" ("How You Spend Your Free Time"), Komsomolskaya pravda, Feb. 24-26, 1966, cited in Rogers, "The Soviet Audience," p. 8. This poll was part of a series conducted by the paper, beginning in May, 1960. Nine polls had been completed by May of 1963, the first two dealing with peace and living standards, the third with the younger generation's self-image. Subsequent polls covered the older generation's view of Soviet youth, problems of young married couples, and what we should send to Mars to represent our earthly accomplishments (see White, "Social Science Research," p. 22).

larger than the Leisure Study sample and one was considerably more representative of the Soviet population. This--taken together with the fact that the poll and the Comcom Leisure Study covered comparable time periods--suggests that the findings of the latter be checked against the findings of the former. Close correspondences between the two can serve to establish a degree of confidence in parameter estimates derived from the Leisure Study data.

Corroborative evidence derived in the foregoing manner may be summarized as follows: Data from the Harvard study, like that from the Comcom Leisure Study, indicate that educational and occupational factors were the most powerful determinants of media consumption, even before the War. Results of the Komsomolskaya pravda poll also support Comcom findings that education is positively correlated with exposure to newspapers, magazines and television.[103] In contrast with the pre-War study, however, the poll indicates that by the beginning of this decade radio-listening had become about the same in all educational groups. Both the Harvard study and the Soviet poll lend support to the Leisure Study findings that correlations between sex or age and communications behavior worked within the educational framework and that men had slightly higher exposure than women. Supplementary data obtained from these two studies indicated the following: In addition to education and occupational standing two attributes positively correlated with media consumption were (1) a favorable attitude toward the Communist regime and (2) a willingness to be politically involved.*1 Another implication of comparisons with the Harvard study was that, while the improved distribution of newspapers and magazines over the last quarter century had probably lessened the influence of residence on exposure to these media, in the early 1960's exposure to magazines still increased with urbanism. Finally, in contrast with the findings of the Comcom Leisure Study, it appeared that exposure differences by sex were smaller than corresponding differences by age.

What these comparisons seem to indicate is the following: The increased education of the Soviet population since the War, the spread of electrification and hence radio into the country side, and the advent of television have combined to increase the communications activity of the workers and collective farmers. These changes have somewhat narrowed the media-consumption gap between the better educated and the laboring classes, but they have not eliminated it. (We should not be too surprised at this, since neither widespread education nor the easy

---

*1Results of the Harvard study indicated, however, that education and occupation were more powerful predictors of media exposure than attitude toward the regime or political involvement.

avaiability of the mass media has closed this gap in more fully urbanized countries, such as England and the United States.)

A series of time budget studies undertaken in the Soviet Union since the late 1950's analyze the amounts of free time respondents spend on various types of activity. They thus provide a somewhat different means of identifying major demographic determinants of media use. (They can also be used, when compared with similar Soviet studies from the inter-War period, to identify secular changes in audience behavior.) A number of problems, which Rogers has discussed in some detail, prevented the straightforward recasting of findings from these studies in the form required for simulation parameter estimates.[*1] Bearing these problems in mind, however, the following conclusions can be drawn from the Soviet time budget studies: Even though they stress the attributes of age and sex above those of education and occupation as predictors of communications behavior, the evidence they present with respect to the relative influence of these variables is either inconsistent

---

[*1]The Soviet studies focus on expenditure of time as the basic unit of measurement, rather than on frequency of exposure. For a discussion of other difficulties in translating results of these studies into the framework of the Comcom inquiry see Rogers, "The Soviet Audience," pp. 290-95.

MEDIUM / VEHICLE ATTRIBUTE	MAGAZINES	NEWSPAPERS	RADIO	TELEVISION	ORAL AGITATION	FOREIGN RADIO
PENETRATION	COMPLETE		Diffus. netwk complete. Recep. netwk incom. Rural areas lack wave sets.	Only half pop. covered by diffusion network. Urban and esp. rural areas lack recep. equip.	Complete	Only about 1/3 of pop. covered by diffusion network. Wave sets concentrated in urban areas.
DISTRIBUTION	Subscription a major factor. Distribution probably restricted to republic of publication.		Wired sets a major factor in rural areas. Grp. listening a factor at work in rural areas and among the less educated.	Sets concentrated urban areas amg. higher social grps. Grp. viewing major factor at home, all areas.	Agitators concentrated slightly more in urban areas, among workers.	Wave sets the sole factor. Programming restricted to evening and early morning.
STRUCTURE	Published on central, republic and lower levels. Specialized by age, sex, occupation and interest.		Originated on central, republic, and lower levels. News carried on programs I, II, IV and rebroadcasts.	Originated on central, republic and lower levels. News carried on programs I, II, and rebroadcasts.	2-3,000,000 volunteers at all levels.	Chief stations: VOA, BBC RL.
TIMING	Twice a month for many important magazines.	Six a week for central, three a wk. for most district, one a week for most lower papers.	News almost every hour on central radio. Three hr. lag for program IV. Less news on local broadcsts.	News 2 or 3 times a day, during eve. hrs. on central television. Less on local broadcasts.	Perhaps once a week on the average.	Evening and early morning hours, every day.
LANGUAGE	Central publications and broadcasts mainly in Russian. Lower level publications and broadcasts mainly in Russian and official language of the republic.				Probably flexible.	In many languages of the U.S.S.R.
EDUCATION (Occupation)	Frequency of exposure and the number and range of titles consumed increased with education and occupational standing.		Frequency of exposure about the same for all educ. & occup. groups.	Frequency of exposure increases with educ. & occup. standing.	Frequency of exposure probably decreases with educ. & occup. standing.	Frequency of exposure increases with educ. & occup. standing.
RESIDENCE	Frequency and range of exposure increases with urbanism.	Frequency and range of exposure about the same among rural and urban persons.	Frequency of exposure probably slightly greater among urban persons.	Frequency of exposure greater in urban areas.		
SEX	Men slightly more exposed than women, although exposure differences work within education and occupational framework.					
AGE	Inconsistent evidence for the influence of age on media exposure. What differences found work within the education and occupational framework.					
PARTY MEMBERSHIP	A favorable attitude toward the Communist regime and a willingness to be politically involved are positively correlated with media consumption.					
MESSAGE AUDIENCE	Subscribers are generally frequent readers. The highly educated and the politically involved are the most exposed to authoritative and to analytical material.		Peak listening in early morning, mid-day, & and evening.	Peak viewing in evening.	About 1/2 of those reporting in CamCom sample attended a meeting during the Cuban crisis about 1/10 after the Kennedy assassination.	The urban, educated and young are probably the most exposed to foreign news.
			Programs attended to differ very little with education and political involvement.			
FUNCTIONS	Medium of the educational elite.	Authoritative organ of official communication.	Most widespread use is as a news medium.	Chief entertainment medium of the less educated.	Used for production agitation. Growth of the mass media has reduced its news-disseminating function.	Corrective and supplement to official network.
	Central publications and broadcasts play leading role in terms of volume, authoritativeness and coverage of major news events. Republic level publications and broadcasts probably substitutable for central counterparts, depending on language and education.					

Fig. 1.6--The Soviet mass media system (1962-63)

crisis and the aftermath of President Kennedy's assassination. In each of these instances, the response of the Soviet mass media system depended not only on its permanent attributes but also on certain crisis-related features we have not yet discussed: the flow of media material and the departures from normal media-use habits triggered by each event. It is to these two "dynamics" that we now turn our attention.

Soviet crisis communication

Our reasons for simulating Soviet media exposure during the Cuban missile crisis and the aftermath of President Kennedy's assassination may be summarized as follows:

--Domestic mass media and foreign radio were important sources of information for the Soviet people during both these periods;

--The thematic treatment of each event in the Soviet media was overt rather than esoteric, thus simplifying the problem of content analysis and magnifying the volume of simulable exposures;

--The early stages of the Cuban crisis represented a good example of Soviet domestic suppression of the news, while information about the Kennedy assassination was broadly propagated by the domestic media, affording some interesting comparisons between the two simulations;

--The amount of data available on media coverage and audience behavior during these crisis periods was sufficient to construct message schedules and response routines for each period.

The Soviet domestic communication system consists of several subsystems each characterized by particular kinds of information media. Among these subsystems are the communication structure of the local community, personal contact with foreigners, Party and State channels, people's courts, the military network (short wave radio, telephone, telegraph, brigades, etc.), the mass media, and rumor nets. Each of these subsystems takes on a different saliency (1) for the Soviet population as a whole under changing exogenous conditions and (2) across subgroups of the population during any given period. Studies such as that of Inkeles and Bauer and their associates, for example, describe the use of oral rumor and the mass media in various strata of Soviet society and how this pattern has been changing over time.[101] Our simulation programs, because they constitute an initial effort, represent only <u>one</u> kind of communications model--that of mass media exposure.[*1] We therefore had to select, for these first experimental simulations, periods during which the mass media were one of the principal communication subsystems circulating relevant messages in the Soviet Union. The Cuban missile crisis and the aftermath of President

---

[*1]In the future it is planned to graft a face-to-face communications model onto the "one-to-many" mass media communications model currently expressed in our simulation programs.

Kennedy's assassination were such periods. The following two well-known propositions about totalitarian communications support this conclusion: (1) In a totalitarian communication system (such as the Soviet Union's) stimuli repeated in the media without letup (i.e., everyday themes) gradually become devalued and, in a sense, meaningless. The individual dismisses them from his attention and is instead attracted by what is new and significant, by any departure from the norm which alters the regular pattern of media materia.[105] (2) Citizens in a totalitarian communication system can hardly afford to ignore references in the media to salient issues of the day, because the media are one of the sources they must rely on for the "official line" with regard to these issues.[106]

Our content analyses identified new and obviously salient themes in the flow of Soviet and external media material during the two simulation periods, themes which must have attracted the attention of large segments of the Soviet population because of their departure from normal media content. Once a Soviet citizen had become aware of either event--whether through the mass media or by word-of-mouth--it seems reasonable to assume that he would have paid attention (1) to the mass of relevant material we know was carried by the domestic media, in order to obtain an authoritative view of events, and (2) to foreign radio broadcasts in order to supplement and perhaps revise this view. So we may assume that the message vehicles in our simulation--Soviet mass media and foreign radio--were among the major sources from which the Soviet population learned about each of these internationally important events.

In simulating the spread of news in the U.S.S.R. about the Cuban crisis and the Kennedy assassination we are dealing with cases of overt communication in crisis situations. They can be contrasted with another kind of communication situation, an example of which is the spread of news in the U.S.S.R. about the Sino-Soviet dispute during its early stages. The two events we are simulating broke upon the world scene very suddenly and their coverage in the media reflected this. Appearances of relevant material built up rapidly and abundantly. Soviet media coverage of the dispute with China, on the other hand, reflected the gradual development of this controversy. During the period when the Soviet people probably first learned about the dispute (1960-61), its expression in probably representative of the actual balance of information carried by the Soviet media during these periods. Finally, one additional circumstance makes these two events interesting choices for simulation. Although the Soviets reported on the Cuban crisis heavily, they did not refer to certain aspects of it (e.g., the United States' claim that the Soviets had missiles in Cuba) until the fourth day after Kennedy's speech. On the other hand, they reported virtually all aspects of the President's assassination as the story developed. This difference provided an experimental framework (1) for exploring in the simulation the effectiveness of foreign radio (which covered all phases of the Cuban crisis) as a supplementary information medium, and (2) for comparing the proportions of the Soviet population exposed to news under conditions of propagation and (temporary) suppression in the domestic media.

The Cuban crisis and the Kennedy assassination are feasible candidates for simulation because the kind of data available on Soviet media coverage is sufficient to construct likely message scenarios for these periods. We have obtained data on Soviet Central Radio broadcasts during the two time periods from Foreign Broadcase Information Service monitoring reports.[107] The _Current Digest of the Soviet Press_ and copies of central and republic newspapers of the period provided the main sources of data on press coverage.[108] Message scenarios for foreign radio were constructed from program transcripts and schedules supplied us by the Voice of America, the Radio Liberty Committee and the British Broadcasting Corporation.[109] Finally, a few descriptive works were used as general sources of information on Soviet media coverage of international news. We summarize these works briefly, insofar as they relate to our own effort.

Detailed analyses of the occurrence and treatment of themes in the Soviet media are almost non-existent. Barghoorn has undertaken a brief analysis of several themes in the Soviet press in 1956 and 1964--dates which bracket the two simulation time periods--and Cantril has analyzed Soviet newspaper themes in 1956.[110] Both writers studied Soviet coverage of the Hungarian revolt, Barghoorn devoting most of his attention to the issue of Pravda published on Friday, November 2, 1956. This issue was also included in Schramm's comparative study of fourteen major world newspapers which appeared on that day.[111] Both Schramm and Barghoorn describe how, while most of the world press was focusing on the Hungarian uprising, the news of British, French and Israeli military operations against Egypt overshadowed everything else in this issue of Pravda. Although Hungary was the other main theme of this issue, the subject was not treated directly except in a brief TASS statement from Budapest reporting "instances of bandit raids." Items from other Communist countries reported support for a declaration issued by the U.S.S.R. government regarding relations among "socialist" countries. Cantril has also dealt with controlled Soviet reporting of news of the Hungarian revolt. He describes Soviet leaders' efforts to distort the true events systematically and to hide the facts. The revolt was described in the Soviet media very much like the more recent Czechoslovakian reform movement as "counterrevolutionary," contributed to by the United States, with the Soviet army coming to the rescue of the Hungarian people.

Another example of Soviet news dissemination in 1956 which Cantril discusses is the reporting of de-Stalinization to the Soviet people. While Khruhshev's speech at the Twentieth Congress occurred in February of that year, the first news most of the world had of it and of Stalin's downgrading was on June 5th and 6th when the full text was published in the Western press. Stalin was blamed for the adverse effects of the cult of personality in Pravda during March, but he was not personally blamed for specific crimes, Not until July 2, 1956, nearly a month after the publication of Khruhschev's speech in the rest of the world and five months after the original speech, was the resolution of the Party's Central Committee, entitled "On Overcoming the Cult of Personality and Its Consequences," published in the Soviet Union. Cantril speculates that this was probably a concession the Party leadership had to make when discussions and criticisms from the outside world could no longer be ignored. He describes how, during the rest of July, there was great discussion in Pravda of the reactions of the people to the resolution indicating the enthusiastic approval of the masses, etc. Finally, with regard to the Sino-Soviet dispute, Barghoorn has analyzed the issue of Pravda for April 3, 1964. The dominant item in this issue was the text of an important speech given by M. A. Suslov earlier that year at a Central Committee plenum. This speech and an editorial defended the Soviet position and criticized the Chinese Communist position in the dispute. As Barghoorn has noted, the appearance of this issue marked the first time one could assume it had become clear to all politically aware Soviet citizens that their country was engaged in a dispute with China, a fact well known in the West long before 1964.

The muted and distorted coverage of the Hungarian uprising and the long delays in publishing Khruhschev's and Suslov's speeches are typical examples of the careful preparation and timing of news disclosure in Soviet political communication. Barghoorn contrasts this with the commitment of the commercial, competitive Western press to promptness in reporting. Cantril includes among the Soviet techniques for controlling media content the use of de-emphasis, half-truths, oversimplification and myth-creation. Keckskemeti has also concluded that, within the limits of unavoidable aspects of reality, a broad scope for manipulating media content is open to totalitarian leaders. Among the techniques he mentions are the concealment, de-emphasis and obfuscation of unfavorable facts and the exaggeration and embellishment of favorable facts.[112] All these characteristics--the deliberate preparation and timing of news disclosures, the control and manipulation of media content--were very much present in Soviet media coverage of the Cuban crisis and the death of Kennedy. By simulation we are seeking to explore some of the exposure consequences of these tactics.

We chose to simulate Soviet information flows during the Cuban crisis and after the Kennedy assassination because the data available on audience behavior during these and similar periods was sufficient to estimate likely response parameters. Before describing this data we should first explain what we mean by "response parameters." As we mentioned above, the first pass through the simulation involves storing a description of a representative sample of the Soviet population. Each individual is described by his demographic characteristics and media-use habits. At the end of the first pass through the computer we thus have a description of Soviet media use during a particular period, i.e., a description of the population which uses the media and the basic probability of each person being exposed to each medium. The second pass through the computer makes the analysis dynamic. In this phase we could simply have calculated what would happen on the average as each medium with a message of interest was made available to each person. If, e.g., the pass I probability of exposure of a particular person to a particular medium were 0.2 then, using this probability, the computer program would have generated the expected value--one-fifth of an exposure--for this person. This would imply that a person who uses that particular medium with a probability p will note any news story in it with a probability 1.0. In reality we know the latter "conditional" probability need not be unitary, nor need it be constant. (The same may be said for the pass I probability of exposure to the medium.) Therefore, the second pass does not mechanically grind out probabilities in this fashion. Instead, it follows a scenario which the analyst writes (1) to generate, for each type of person, the conditional probability of being exposed to each kind of news story in each medium, and (2) to represent the kinds of changes in message and media exposure probabilities which typically take place during any series of events such as a crisis. These conditional exposure probabilities and the changes they undergo are what we have been referring to as "response parameters."

The simulation model becomes interesting when we take account of the differences between normal and crisis behavior. For example, we have assumed that at the beginning of the Cuban crisis period, when the saliency of events was low, Soviet citizens paid normal attention to the mass media. We have further assumed that as soon as they heard about Kennedy's speech, the American charges, or the Soviet-American confrontation, Soviet citizens became more aware of and concerned about the crisis, and, in seeking additional information about it, they paid increased attention to news in general and to foreign radio in particular. In the simulation we were able to reflect hypothesized circumstances such as these by raising individual exposure probabilities for crisis-related messages, either as a function of prior exposure to key messages or as a function of the stage of the scenario. Pass II subroutines permit a variety of historical assumptions. As another example, one may wish to assume that, unless a message is reinforced within a certain length of time, it becomes forgotten. Under such circumstances, individual exposure probabilities for relevant material might first be raised as a function of exposure to one or more key messages, or as a function of the stage of the scenario, and then returned to their initial values after a hypothesized period of non-exposure, i.e., at a later stage of the scenario.

Data for estimating Soviet audience response parameters came from several sources. Answers to the Comcom Leisure Study questionnaire gave us some information on how much and in what ways Soviet citizens increase their information-seeking during a crisis. The results of a second set of interviews, conducted by Dr. Rogers with a subset of the Leisure Study sample, provided data which we were able to use to estimate, for various subgroups in the Soviet population, the relative probabilities of exposure to different kinds of newspaper stories.[113] Other results of the Leisure Study questionnaire, together with documented periodicities for Soviet print media and published broadcast schedules for Soviet electronic media and foreign radio, provided the basis for estimating the audiences of news items appearing in different segments of these media. Finally, the author was able to obtain important qualitative data on Soviet media treatment of, and audience response to, these two crises from a conversation with the former editor of a major Soviet science magazine.[*1]

Having discussed the nature of the problems to which this thesis is addressed and having reviewed the pertinent literature on them, we conclude this introductory chapter with a description of the research procedures that were followed and an outline of each chapter's contents.

[*1] Mr. Leonid Finkelstein, former editor of a Soviet scientific monthly magazine, who now resides in England, was kind enough to give us an hour of his time for this purpose.

Outline and Procedure

The first step of the procedure followed for this thesis was the specification of a mathematical model of mass media communication, a task in which this author participated with other members of the Comcom Project staff.[114] Once the model had been completed the next step was to express it in a series of simulation computer programs that could be run on the M.I.T. compatible time-sharing systems.[115] The author collaborated with a colleague, John F. Kramer, in the design, coding, debugging and testing of these simulation programs.[116] In Chapters II and III we describe the Comcom model of mass media exposure and the structure and phasing of the simulation programs in which we have expressed it. These two chapters should be of special interest to behavioral scientists concerned with simulation and modelling, as should the sections of this introduction in which we discussed the advantages of simulating media exposure (pp. 18-27 above) and reviewed some important behavioral science applications of the simulation technique (pp. 34-58 above).

The next major step we undertook was to assemble all the data required in order to use the programmed model to simulate the spread of news in the U.S.S.R. during the two crisis periods referred to above. The data that were gathered for this purpose included (1) statistics on the volume and distribution of the Soviet mass media, much of which were drawn from material compiled by the Comcom Project staff (in part for the simulation and in part for the production of descriptive monographs); (2) data on the Soviet population, and data on its patterns of media use and message response, drawn largely from Soviet census figures and from the Comcom Leisure Study interviews respectively;[117] (3) a content analysis of Soviet media material and foreign radio broadcasts based on sources described in the previous section. Students of Soviet mass communication will be especially interested in Chapters IV and V of this thesis in which we describe at length the kinds of data on the Soviet media system which were required for the simulation, the secondary analyses which we had to perform on this data in order to estimate various model parameters, and the resulting media, audience, and audience-response structures that were mapped into computer storage. The sections of this introduction in which we discussed the general significance of media exposure (pp. 5-18 above) and catalogued some salient features of the Soviet mass media system (pp. 59-92 above) should also be of interest to specialists in Soviet mass communication.

The final step of the procedure we followed for this thesis was to allow our computer-stored model of the Soviet mass media system to interact, via the simulation programs, with message schedules for two different scenarios--the Cuban missile crisis, and the assassination of President Kennedy. A simulated history of the Soviet population's exposure to specific themes in the Cuban crisis media coverage is analyzed in Chapter VI, and Chapter VII presents the same type of analysis for the Kennedy assassination. Chapters VI and VII should be of general interest to anyone concerned with the communications aspects of crisis management, as should the section of this introduction in which we speculated on the potential research and policy uses of communications simulations in general and a Soviet communications simulation in particular (pp. 27-33 above), and the section in which we described some of the dynamics of crisis behavior that can be represented in the Comcom simulation (pp. 92-104 above).

FOOTNOTES

CHAPTER I

[1]This formulation of the simulation's objectives and of the conceptual problems involved appears in a paper co-authored by Ithiel de Sola Pool, John F. Kramer and myself, entitled "Who is Listening: Evaulation Audiences" (American Statistical Association. 1965 Proceedings of the Business and Economic Statistics Section [Philadelphia, 1965], pp. 43-49).

[2]This formulation of the simulation's predictions appears in Center for International Studies, M.I.T., Research Report: 1964-65, Studies in International Communication (Cambridge: Center for International Studies, M.I.T., 1966).

[3]For a discussion of the social-indexing value of the communications process see Ithiel de Sola Pool, "Computer Simulations of Total Societies," in The Study of Total Societies, ed. by Samuel Z. Klausner (Garden City: Doubleday, 1967).

[4]Paul F. Lazarsfeld, "The Prognosis for International Communications Research," Public Opinion Quarterly, XVI, No. 4 (1953), 481-90.

[5]Harwood Childs and John B. Whitton, Propaganda by Short Wave (Princeton: Princeton University Press, 1942); Ernst Kris and Hans Speier, German Radio Propaganda (New York: Oxford University Press, 1944).

[6]Ralph Linton, ed., The Science of Man in the World Crisis (New York: Columbia University Press, 1945). This volume included a section on the role of the mass media in the development of an international authority.

[7]Leo Lowenthal, introduction to a special issue of Public Opinion Quarterly, Public Opinion Quarterly, XVI, No. 4 (1953).

[8] Using a "two-step" model of communications, researchers from the Bureau of Applied Social Research at Columbia University studied "opinion leaders" who were thought to mediate between the mass media and the populace (see, e.g., Paul F. Lazarsfeld, Bernard Berelson, and Hazel Gaudet, The People's Choice; How the Voter Makes up His Mind in a Presidential Campaign (New York: Columbia University Press, 1948). Subsequent studies indicated that this two-step model was overly simple. The general finding was that the network of social communications is a socially structured one depending upon established patterns of social relations (see, e.g., Bernard R. Berelson, Paul F. Lazarsfeld, and William N. McPhee, Voting: A Study of Opinion Formation in a Presidential Campaign [Chicago: University of Chicago Press, 1954]; Elihu Katz and Paul F. Lazarsfeld, Personal Influence; The Part Played by People in the Flow of Mass Communications [New York: Free Press of Glencoe, 1966]).

[9] A Large number of articles on audience characteristics and measurement techniques appear in the Journal of Advertising Research and in the Journal of Marketing Research.

[10] Ralph L. Day, "Linear Programming in Media Selection," Journal of Advertising Research, II, No. 2 (1962), 40-44.

[11] In order to approximate non-linear response characteristics, Brown and Warshaw incorporate non-linear functions in their model ("Media Selection by Linear Programming").

[12] Kotler has developed a mathematical programming technique for setting advertising schedules to maximize "rated exposure value" within a given budget. This model incorporates the effects of cumulation and duplication insofar as it allows the user to formalize his assumptions about them. It does not, however, include any of the factors which actually determine these effects. For a description of the technique see Philip Kotler, "Toward an Explicit Model for Media Selection," Journal of Advertising Research, IV, No. 1 (1964), 34-41.

[13] In the late twenties the Payne Fund studies investigated the effect of movies on children's morals, attitudes and behavior. Subsequently, the Rockefeller Foundation became interested in the cultural effects of radio. More recent studies of the effects of the mass media,

studies that were motivated at least in part by cultural concerns, include the following: Paul F. Lazarsfeld, Radio and the Printed Page (New York: Duell, Sloan & Pearce, 1940); Leo Bogart, The Age of Television (New York: Ungar, 1951); Eleanor E. Maccoby, "Why Do Children Watch Television," Public Opinion Quarterly, XVIII, No. 3 (1954), 239-44; Hilde T. Himmelweit, A. N. Oppenheim, and Pamela Vince, Television and the Child (London: Oxford University Press, 1958); Lotte Bailyn, "Mass Media and Children: A Study of Exposure Habits and Cognitive Effects," Psychological Monographs: General and Applied, LXXIII, No. 1 (1959), 1-38; William A. Belson, "Effects of Television on the Interest and Initiative of Adult Viewers in Greater London," British Journal of Psychology, L (1959), 145-58; Wilbur Schramm, Jack Lyle, and Edwin B. Parker, Television in the Lives of Our Children (Stanford: Stanford University Press, 1961); Edwin B. Parker, "Changes in the Function of Radio with the Adoption of Television," Journal of Broadcasting, V (1961), 39-48; Takeo Furu, Television and Children's Life (Tokyo: Japanese Broadcasting Corp., 1962); Edwin B. Parker, "The Effects of Television on Public Library Circulation," Public Opinion Quarterly, XXVII, No. 4 (1963), 578-89; Wilbur Schramm, Jack Lyle, and Ithiel de Sola Pool, The People Look at Educational Television (Stanford: Stanford University Press; 1963).

The results of most of these studies indicate that, while there is abundant evidence that personal characteristics influence media habits, there is little or no evidence that exposure to specific kinds of media material has any direct effect on personal characteristics.

[14]For a discussion of this critique of the mass media, and an opposing view, see Raymond Bauer and Alice Bauer, "American Mass Society and Mass Media," The Journal of Social Issues, XVI, No. 3 (1960), 3-66.

[15]Books appearing in the inter-War period which called attention to the rhetorical and psychological devices used by the propagandist included the following: Walter Lippmann, Public Opinion (New York: MacMillan, 1922); Harold D. Lasswell, Propaganda Technique in the World War (New York: Alfred A. Knopf, 1927); Leonard W. Doob, Propaganda; Its Psychology and Technique (New York: H. Holt, 1935); Sidney Rogerson, Propaganda in the Next War (London, G. Bles, 1938); Serge Chakhotin, The Rape of the Masses, trans, by E. W. Dickes (New York: Alliance, 1940);

Hadley Cantril, The Psychology of Social Movements (New York: J. Wiley, 1941).

Most of the persuasive techniques discussed and analyzed in these sources were first enumerated in Aristotle's Rhetoric.

[16] See, e.g., Harold D. Lasswell, Psychopathology and Politics (Chicago: University of Chicago Press, 1930) and Bruce Lannes Smith, "The Political Communication Specialist of Our Times," in Propaganda, Communication, and Public Opinion; A Comprehensive Reference Guide, ed. by Bruce Lannes Smith, Harold D. Lasswell, and Ralph D. Casey (Princeton: Princeton University Press, 1946).

[17] Bernard Berelson, "Communications and Public Opinion," in Reader in Public Opinion and Communication, ed. by Bernard Berelson and Morris Janowitz (Glencoe: Free Press, 1959), pp. 448-62.

[18] Professors Raymond A. Bauer and Robert D. Buzell discuss this use of simulation in "Mating Behavioral Science and Simulation," Harvard Business Review, XLII, No. 5 (1964), 124. This article includes two examples of how simulation can guide data gathering: (1) If a simulation indicates that the same decision is "best" regardless of a particular range of values over which some piece of data may vary, and if the decision-maker believes the data lie within this range, then there is no reason to obtain the data, since it will not affect his decision; (2) Estimates needed and acquired for one part of a simulation model might preclude further experimentation to gather the same data for other parts of the model or for other models.

[19] The Center for International Studies of the Massachusetts Institute of Technology has issued one of a series of memoranda, "Program on Problems of International Communications and Security," Status Report, October, 1965, in which this use of simulation is discussed.

[20] Pool, "Computer Simulations of Total Societies," p. 57. A knowledge of communications theory enables us to identify the relevant variables and hence to build an appropriate model. The operation of a simulation model, in turn, requires certain data--for inputs, for parameter estimates, and for validation.

[21]Professor Ithiel de Sola Pool discusses the relationship between media development and social and political change in the Soviet Union in "The Changing Soviet Union," Current, No. 67 (1966), 12-17. My own discussion of this subject rests largely on an earlier version of Professor Pool's article which appeared in mimeographed form ("Opportunities for Change: Communications with the U.S.S.R.," paper delivered at the Workshop in Communications with the Peoples of the U.S.S.R., New York University, November 20, 1965).

[22]Pool, "Opportunities for Change," p. 15.

[23]These questions were first suggested to me as possible targets of simulation by Professor Pool.

[24]Center for International Studies, M.I.T., "A Program of Research," An Application for Renewal Funding Submitted to ARPA (the Adanced Research Projects Agency of the Department of Defense), January 1, 1964, p. 5.

[25]Center for International Studies, M.I.T., "A Program of Research," A Preliminary Application for Renewal Funding submitted to ARPA, January 12, 1966, pp. 2-3.

[26]Center for International Studies, "A Program of Research," A Preliminary Application, January 12, 1966, p. 2.

[27]This is a paraphrase of a question appearing in the M.I.T. Center for International Studies memorandum, "A Program of Research," submitted to ARPA, April 1, 1962, p. 2.

[28]*Ibid.*, p. 27.

[29]*Ibid.*

[30]Rufus P. Browning, *Computer Programs as Theories of Political Processes*, Reprint No. 30 (Madison: Social Systems Research Institute, University of Wisconsin, 1962), p. 582.

[31]James S. Coleman, "Social Simulation," p. 2. (Mimeographed.)

[32]Our survey will cover only a sample of the great variety of behavioral science simulations. For a more comprehensive picture of the various conceptions of simulation the reader is referred to the following volumes: Harold Borko, ed., Computer Applications in the Behavioral Sciences (Englewood Cliffs: Prentice-Hall, 1962); Edward Feigenbaum and Julian Feldman, eds., Computers and Thought (New York: McGraw-Hill, 1963); Harold Guetzkow, ed., Simulation in Social Science: Readings (Englewood Cliffs: Prentice-Hall, 1962); Edward Holland with R. W. Gillespie, Experiments on A Simulated Underdevelopment Economy (Cambridge: M.I.T. Press, 1963); Guy H. Orcutt, Martin Greenberger, J. Korbel, and A. Rivlin, Microanalysis of Socioeconomic Systems: A Simulation Study (New York: Harper & Row, 1961); Silvan Tomkins and Samuel Messick, Computer Simulation of Personality (New York: J. Wiley, 1963); James W. Beshers, ed., Computer Methods in the Analysis of Large Scale Social Systems (Cambridge: Joint Center for Urban Studies, 1965); William D. Coplin, ed., Simulation in the Study of Politics (Chicago: Markham, 1969).

[33]Games have generally been man-machine simulations, i.e., simulations in which an individual or group of individuals is aided by a computer. Examples are the business games used in management training (see, e.g., F. M. Ricciardi and C. J. Craft, Top Management Decision Simulation: The AMA Approach [New York: American Management Association, 1957]) and the military and political games used in training military executives and political decision-makers (see, e.g., Joseph M. Goldsen, "The Political Exercise, An Assessment of the Fourth Round," the RAND Corp., D-3640-RC, Washington, D.C., May 30, 1956 [Mimeographed], and COLD WAR, a military-political game developed by Dr. John Kennedy, Robert Chapman, Olaf Helmes, Lloyd Shapley and Milton Weiner of the RAND Corporation).

Games have also included all-man simulations, i.e., simulations which involve only individuals or groups of individuals. Examples are legislative games used for experimental purposes and war games used for predicting the outcomes of military efforts. Another example of all-man simulations are the inter-nation simulations used in training foreign policy decision-makers (see, e.g., Lincoln P. Bloomfield and Norman J. Padelford, "Three Experiments in Political Gaming," American Political Science Review, LII (1959), 1105-15; Harold Guetzkow, "Isolation and Collaboration: A Partial Theory of Inter-Nation Relations," Conflict Resolution, I (1957), 48-68; Harold Guetzkow, "Training for Policy-Making Roles through Organizational Simulation," American Society of Training Directors. Proceedings of the Fourteenth Annual Conference [1958], pp. 76-79).

Games have even been built around all-machine simulations, i.e., simulations which involve only computers. Examples of all machine simulations are computerized war-gaming models of command-control systems (see, e.g., Leland F. Page, "A Dynamic Model for Simulating Military Command Systems" [professional paper, Systems Development Corporation, 1964]).

[34]For a more detailed discussion of the differences between all-man, man-machine, and all-machine simulations the reader is referred to Robert P. Abelson, "Simulation of Social Behavior," in The Handbook of Social Psychology, ed. by Gardner Lindzey and Elliot Aronson (5 vols., 2d ed.; Addison-Wesley, 1954), II, 274-356.

[35]Coleman, "Social Simulation," p. 4.

[36]Browning, Computer Programs, p. 572.

[37]Ibid., p. 565.

[38]Allen Newell, J. Clifford Shaw and Herbert A. Simon, "Empirical Explorations of the Logic Theory Machine: A Case Study in Herristics," Institute of Radio Engineers. Proceedings of the Western Joint Computer Conference (New York, 1957), pp. 218-30.

[39]H. Gelertner and M. Rochester, "Intelligent Behavior in Problem-Solving Machines," IBM Journal of Research and Development, II (1958), 336-45.

[40]Edward A. Feigenbaum, "The Simulation of Verbal Learning Behavior," in Computers and Thought, ed. by Feigenbaum and Feldman, pp. 297-309.

[41]Julian Feldman, "Simulation of Behavior in the Binary Choice Experiment," in Computers and Thought, ed. by Feigenbaum and Feldman, pp. 329-46.

[42]Earl B. Hunt and Carl A. Hovland, "Programming a Model of Human Concept Formation," in *Computers and Thought*, ed. by Feigenbaum and Feldman, pp. 310-25.

[43]Robert K. Lindsay, "The Reading Machine Problem" (unpublished Ph.D. dissertation, Carnegie Institute of Technology, 1961); Bert F. Green Jr., Alice K. Wolf, Carol Chomsky, and Kenneth Laughery, "Baseball: An Automatic Question-Answerer," Institute of Radio Engineers. *Proceedings of the Western Joint Computer Conference* (New York, 1961), pp. 219-24.

[44]Allen Newell, J. Clifford Shaw and Herbert A. Simon, "Chess-Playing Programs and the Problem of Complexity," *IBM Journal of Research and Development*, II (October, 1958); Alex Bernstein and Michael de V. Roberts, "Computer versus Chess-Player," *Scientific American*, CCVIII (1958), 96-105.

[45]Arthur Samuel, "Some Studies in Machine Learning Using the Game of Checkers," *IBM Journal of Research and Development*, III (1959), 211-29.

[46]Geoffrey P. E. Clarkson, *Portfolio Selection: A Simulation of Trust Investment* (Englewood Cliffs: Prentice-Hall, 1962).

[47]Allen Newell, J. Clifford Shaw, and Herbert A. Simon, "Report on A General Problem-Solving Program," UNESCO. Proceedings of the International Conference on Information Processing (Paris, 1960), pp. 256-64. (See also many other articles by Newell, Shaw, and Simon.)

[48]Walter R. Reitman, "Programming Intelligent Problem Solvers," *IRE Transactions of the Professional Group on Human Factors in Electronics* (1961), 27-33.

[49]Fred M. Tonge, *A Heuristic Program for Assembly Line Balancing* (Englewood Cliffs: Prentice-Hall, 1961).

[50]Walter R. Reitman, Richard B. Grove, and Richard G. Shoup, "Argus: An Information-Processing Model of Thinking," *Behavioral Science*, IX (July, 1964), 270-81.

[51] Robert P. Abelson, "Computer Simulation of 'Hot' Cognition," in Computer Simulation of Personality, ed. by Tomkins and Messick, pp. 277-98.

[52] Robert P. Abelson, "Simulation of Social Behavior," in Handbook of Social Psychology, ed. by Lindzey and Aronson.

[53] Ibid.

[54] For further references on computer simulation of individual cognitive processes the reader is referred to the following sources: Articles in the "Symposium on Simulation," American Economic Review, L (December, 1960), 892-932; M. Shubik, "Bibliography on Simulation, Gaming, Artificial Intelligence and Allied Topics," Journal of the American Statistical Association, LV (December, 1960), 736-51; Marvin Minsky, "A Selected Description-Indexed Bibliography of the Literature on Artificial Intelligence," IRE Transactions on Human Factors in Electronics, HFE-II (March, 1961), 39-55.

[55] Richard M. Cyert, Edward A. Feigenbaum, and James G. March, "Models in A Behavioral Theory of the Firm," Behavioral Science, IV (April, 1959), 81-95; Richard M. Cyert and James G. March, "A Behavioral Theory of Organizational Objectives," in Modern Organization Theory, ed. by Mason Haire (New York: J. Wiley, 1959), pp. 76-90; Richard M. Cyert and James G. March, A Behavioral Theory of the Firm (Englewood Cliffs: Prentice-Hall, 1963).

[56] H. M. Marcowitz, B. Hausner, and H. W. Karr, Simscript: A Simulation Programming Language (Englewood Cliffs: Prentice-Hall, 1964).

[57] GPSS is a simulation programming language developed by Geoffrey Gordon of IBM.

[58] J. Weizenbaum, "SLIP", Communications of the Association for Computing Machinery, VI, No. 9 (1963). SLIP is often used when it is convenient to conceptualize the data for a simulation partly as lists and partly as arrays. (See n. *1, p. 37 for a discussion of these two approaches.)

[59]Bernard Hanon, "The Use of Simulation in the Analysis of Business Systems," The American Behavioral Scientist, VIII, No. 9 (1965), 4-7.

[60]See, e.g., Browning, Computer Programs, p. 564. Simulation has generally been employed by behavioral scientists for explanatory rather than tactical purposes. Abelson uses the term in the former sense when he describes simulation as ". . . attempts at flexible imitation of processes and outcomes for the purpose of clarifying or explaining the underlying mechanisms involved" ("Simulation of Social Behavior," p. 275. The italics are mine.).

[61]Ithiel de Sola Pool, Robert P. Abelson, and Samuel Popkin, Candidates, Issues & Strategies: A Computer Simulation of the 1960 and 1964 Presidential Elections (Cambridge: The M.I.T. Press, 1964), p. 7.

[62]Kenneth M. Colby, "Computer Simulation of a Neurotic Process," in Computer Simulation of Personality, ed. by Tomkins and Messick, pp. 165-79.

[63]Rodney M. Coe, "Conflict, Interference, and Aggression: Computer Simulation of a Social Process," Behavioral Science, IX (April, 1964), 186-97.

[64]John C. Lochlin, "A Computer Program that simulates Personality," in Computer Simulation of Personality, ed. by Tomkins and Messick, pp. 189-211.

[65]James S. Goleman and Jerome Kirk, "Simulation in the Study of Social Structure: Interaction in A 3-Person Group," Department of Social Relations, John Hopkins University. (Mimeographed.)

[66]John T. Gullahorn and Jeanne E. Gullahorn, "A Computer Model of Elementary Social Behavior," in Computers and Thought, ed. by Feigenbaum and Feldman, pp. 375-86.

[67]Raymond Breton, "Output Standards and Productive Behavior in Non-Cooperative Industrial Work Groups," Baltimore, Department of Social Relations, Johns Hopkins University. (Mimeographed.)

[68] Ithiel de Sola Pool and Allan R. Kessler, "Crisiscom: A Computer Simulation of Perception and Decision Making During a Crisis," *IEEE International Convention Record*, Part 6 (1965), pp. 75-80; Ithiel de Sola Pool and Allan R. Kessler, "The Kaiser, The Tsar, and the Computer: Information Processing in a Crisis," *The American Behavioral Scientist*, VIII, No. 9 (1965), 31-38.

[69] William N. McPhee, *Formal Theories of Mass Behavior* (New York: Free Press of Glencoe, 1963).

[70] Robert B. Smith, "Leadership, Participation, and Anomie: A Model Simulating the Effects of Leadership" (unpublished manuscript).

[71] James S. Coleman, "The Use of Computers in the Study of Social Organization" (paper presented to the Sociological Research Association, Los Angeles, 1963).

[72] James S. Coleman, "Analysis of Social Structures and Simulation of Social Processes with Electronic Computers," in *Simulation in Social Science: Readings*, ed. by Harold Guetzkow (Englewood Cliffs: Prentice-Hall, 1962), pp. 61-69; James S. Coleman and Frank Waldorf, "Analysis and Simulation of Reference Group Processes" (paper presented at the American Psychological Association meetings, St. Louis, 1962).

[74] Abelson refers to this as "system simulation" ("Simulation of Social Behavior").

[75] For a more extended discussion of the differences between data-rich and data-poor simulations, see Pool, "Computer Simulations of Total Societies."

[76] The differences between prognostic and process simulations are widely recognized. See, e.g., Robert P. Abelson, "The Use of Surveys in Simulations" (paper delivered at the AAPOR Conference, May 20, 1962), pp. 10-11; Abelson, "Simulation of Social Behavior"; Coleman, "Social Simulation," p. 9; John T. Gullahorn and Jeanne E. Gullahorn, "Some Computer Applications in Social Science," *American Sociological Review*, XXX, No. 3 (1965), 356; Pool, Abelson, and Popkin, *Candidates, Issues & Strategies*, p. 4; Pool, "Computer Simulations of Total Societies," pp. 56-57.

[77] James M. Beshers, "Birth Projections with Cohort Models," Demography, II (1965), 593-99; James M. Beshers, "Computer Models of Social Processes: The Case of Migration," Demography, IV, No. 2 (1967), 838-42.

[78] T. Hägerstrand, "A Monte Carlo Approach to Diffusion," European Journal of Sociology, VI (1965), 43-67; T. Hägerstrand, "On Monte Carlo Simulation of Diffusion," in Quantitative Geography, ed. by William L. Garrison (Evanston: Northwestern Studies in Geography, 1966).

[79] Forrest R. Pitts, "Chorology Revisited--Computerwise," Professional Geographer, XIV (1962), 1-5; Forrest R. Pitts, "Problems in Computer Simulation of Diffusion," Papers and Proceedings of the Regional Science Association, XI (1963), 111-19.

[80] Arnold E. Amstutz, "Management Use of Computerized Micro-Analytic Behavioral Simulations" (working paper, Alfred P. Sloan School of Management, Massachusetts Institute of Technology, March, 1966).

[81] Donald E. Stokes and Gudmund R. Iverson, "Restoring Forces and the American Party Balance," Survey Research Center, University of Michigan. (Mimeographed draft.)

[82] William N. McPhee, "Notes on A Campaign Simulator," Public Opinion Quarterly, XXV, No. 2 (1961), 184-93; William N. McPhee and Robert B. Smith, "A Model for Analyzing Voting Systems," Bureau of Applied Social Research, Columbia University. (Mimeographed.)

[83] James S. Coleman and Frank Waldorf, "Study of Voting Systems with Computer Techniques," Department of Social Relations, Johns Hopkins University. (Mimeographed.)

[84] Robert P. Abelson and Alex Bernstein, "A Computer Simulation Model of Community Referendum Controversies," Public Opinion Quarterly, XXVII (1963), 93-122.

[85] Ithiel de Sola Pool and Robert Abelson, "The Simulmatics Project," Public Opinion Quarterly, XXV, No. 2 (1961), 167-183; Pool, Abelson and Popkin, Candidates,

Issues & Strategies. Two popularizations of this research are Thomas B. Morgan, "The People-Machine," Harper's Magazine, CCXXII (1961), 53-57 and Eugene Burdick, The 480 (New York: Dell Publishing Co., 1965).

86 Simulmatics Corporation, "Simulmatics' Media-Mix I"; Simulmatics Corporation, "The Simulmatics' Media-Mix."

87 Samuel L. Popkin, "A Model of a Communication System," The American Behavioral Scientist, VIII, No. 9 (1965), 8-11; Pool, Kramer, and Selesnick, "Evaluating Audiences"; Pool, "Computer Simulations of Total Societies."

88 Kullervo Rainio, "A Stochastic Theory of Social Contacts: A Laboratory Study and Application to Sociometry," Transactions of the Westermarck Society (Copenhagen: Munksgaard, 1962), VIII; Kullervo Rainio, "Social Interaction as A Stochastic Learning Process," European Journal of Sociology, VI (1965), 68-88.

89 Pool, "The Mass Media and Politics."

90 Vladimir Il'ich Lenin, On Organization (New York: International Publishers, 1929), pp. 57-58.

91 Vladimir Il'ich Lenin, What is to be Done (New York: International Publishers, 1929), pp. 164-65.

92 See, for example, Hadley Cantril, Soviet Leaders and Mastery Over Man (New Brunswick, New Jersey: Rutgers University Press, 1960).

93 For discussions of the difference between Communist and non-Communist views of public opinion and the role of the media in shaping it see Wilbur Schramm, Four Working Papers on Propaganda Theory (Urbana: University of Illinois, January, 1955) and Pool, "The Mass Media and Politics."

94 See, e.g., Frederick C. Barghoorn, "The Shaping and Direction of Public Opinion," Politics in the USSR: A Country Study (Boston: Little, Brown and Company, 1966), pp. 148-181 and Pool, "Opportunities for Change."

[95]For a review of these developments see Ralph K. White, "Social Science Research in the Soviet Bloc," Public Opinion Quarterly, XXVIII, No. 1 (1964), 20-26.

[96]Rosemarie Straussnig Rogers, "The Soviet Audience: How it Uses the Mass Media" (unpublished Ph.D. Thesis, Massachusetts Institute of Technology, 1967), pp. 25-49 and pp. 79-103; Barghoorn, "The Shaping of Public Opinion," pp. 157-63; F. Gayle Durham, Radio and Television in the Soviet Union, Research Program on Problems of International Communication and Security (Cambridge: Center for International Studies, M.I.T., 1965); F. Gayle Durham, News Broadcasting on Soviet Radio and Television, Research Program . . . (Cambridge: Center . . ., M.I.T., 1965); Inkeles, Public Opinion in Soviet Russia.

In her outline of the structure and distribution of the Soviet press, Rogers cites the following English language works: Boris I. Gorokhoff, Publishing in the U.S.S.R., Slavic and East European Series, Vol. XIX (Indianapolis: Indiana University Publications, 1959); Theodore E. Kruglak, The Two Faces of Tass (Minneapolis: The University of Minnesota Press, 1962); Anthony Buzek, How the Communist Press Works (New York: Frederick A. Praeger, 1964). She also cites the following Soviet documentary sources: Pechat' SSSR V (The Press of the U.S.S.R.) (3 vols.; Moscow: Izdatyel'stvo vsyesoyuynoy knizhnoy palati; 1958, 1960, 1965); N. Bogdanov and B. Vyayemskiy, Spravochnik Zhurnalista (The Journalist's Handbook) (2 ed.; Leningrad - Ienizdat, 1961, 1965).

[97]Rogers, "The Soviet Audience," p. 5.

[98]The results of this analysis are discussed in Chapters IV and V. Most of the data come from two sets of interviews conducted outside the Soviet Union with former residents of the country, or, in a few cases, with Soviet visitors to Western Europe. For a discussion of the nature of the samples, the survey instruments and the procedures employed see Rogers, "The Soviet Audience," pp. 15-24.

[99]The results of this analysis are presented in "The Soviet Audience." Dr. Rogers was kind enough to make available to the author much of the coded data from the two sets of interviews.

[100]In addition to the documentary material cited above, we have drawn on an analysis of 1959 Soviet census figures by John F. Kramer, "The Population of the Soviet Union, Broken by Age, Sex, Urban-Rural, Education, and Soviet Class" (mimeo, 1965) and an article entitled "The C.P.S.U. in Figures (1961-1964)" from the Party journal Partinaya zhizn, No. 10 (May, 1965), pp. 8-17, quoted in The Current Digest of the Soviet Press, XVII (August, 1965), 14-18. We have used these sources to determine, approximately, how the Soviet population was distributed along various demographic variables in 1962-63.

[101]Inkeles and Bauer report these results in their chapter "Keeping up with the News," in The Soviet Citizen; see also Peter H. Rossi and Raymond A. Bauer, "Some Patterns of Soviet Communications Behavior," Public Opinion Quarterly, XVI, No. 4 (1953), 653-670; Raymond A. Bauer and David B. Gleicher, "Word-of-Mouth Communication in the Soviet Union," Public Opinion Quarterly, XVII, No. 3 (1964), 297-310.

[102]Rogers cites a number of these studies which appeared in Soviet books or chapters of books, Soviet journal articles, and Soviet monographs (see "The Soviet Audience," pp. 282-84).

[103]Compare, e.g., the following frequencies of regular exposure found in the Leisure Study and in the Komsomolskaya Pravda poll:

	Newspapers		Magazines		Television	
Education	Comcom	Poll	Comcom	Poll	Comcom	Poll
Higher	91%	94.7%	79%	90.5%	40%	46.4%
Secondary	83%	94.6%	71%	75.9%	36%	39.3%
Less than Secondary	81%	82.8%	60%	61.1%	32%	31.8%

These data are taken from tables presented in Rogers, "The Soviet Audience," pp. 55 and 110. Comcom respondents were not questioned about the frequency of their radio listening, so no comparison could be made for this medium.

[104] Audits & Surveys Company, Inc., *A National Study of Newspaper Reading*, vol. I: *The Functions of Newspapers for Their Readers* (2 vols.; New York: Audits & Surveys Company, Inc., 1961); Alfred Polity Research, Inc., *A Study of Duplication* (New York: Time, Inc., 1954); Bo W: Son Schyberger, *Methods of Readership Research*, Lund Business Studies (Lund, Sweden: University of Lund, 1965).

[105] See, e.g., Paul Kecskemeti, "Totalitarian Communications as a Means of Control," *Public Opinion Quarterly*, XIV, No. 2 (1950), 224-34.

[106] *Ibid.*

[107] Foreign Broadcast Information Service, *Daily Report*, Foreign Radio Broadcast, Nos. 207-214 and and 229-232 (Washington, D.C.: Foreign Broadcast Information Service, 1962-63). The *Daily Report* presents material from foreign radio broadcasts, press transmissions, and selected newspapers. Items are processed from the first or best available source and therefore represent only a sampling of the material transmitted.

[108] Joint Committee on Slavic Studies, *Current Digest of the Soviet Press*, Vol. XIV, Nos. 43 and 44 and Vol. XV , Nos. 46-49 (Ann Arbor: Joint Committee on Slavic Studies, 1962-63). The contents of the two most important Soviet newspapers, *Pravda* and *Izvestia*, are utilized in the *Current Digest* approximately one month after the date of their publication in Moscow. The *Current Digest* also contains selections from approximately sixty other Soviet newspapers and magazines. Important items are given in full while others are condensed or are represented by headline.

[109] The Voice of America supplied us with transeripts of their broadcasts to the Soviet Union during the Cuban crisis and after President Kennedy's assassination and their broadcast schedules for various regions of the U.S.S.R. The Radio Liberty Committee provided microfilms of their Russian language broadcasts during these two periods as well as their broadcast schedules for various parts of the U.S.S.R. The British Broadcasting Corporation was not able to supply actual transcripts of broadcasts but they did send us schedules of their news broadcasts during these two

periods. The likely content of these broadcasts was reconstructed from a content analysis of the London Times editions published during the two periods in question.

[110]Barghoorn, "The Shaping of Public Opinion," pp. 149-81; Cantril, The Soviet Leaders, pp. 108-109.

[111]Wilbur Schramm, ed., One Day in the World's Press (Stanford: Stanford University Press, 1959).

[112]Kecskemeti, "Totalitarian Communications," p. 226.

[113]Dr. Rogers has completed a monograph based on an analysis of this data, entitled "How Russians Read Their Press: Patterns of Selection in Pravda and Izvestia," which is being published by the Center for International Studies at M.I.T.

[114]Professor Pool is responsible for the basic outlines of the model and the various aspects of media exposure which it emphasizes. He specified these features in the mimeographed memoranda Communications Simulation, Comcom Project, Simulation Memo #1, July 10, 1963 and ComCom Simulation Pass I, Comcom Project, Simulation Memo #3, Fall, 1963, and in a series of conversations with this author and with John F. Kramer. Ernest Heau is also responsible for some features of the simulation model; his contribution may be found principally in the mimeographed memorandum Comcom Simulation: Pass II, Comcom Project, Simulation Memo #2, July, 1963. Samuel Popkin contributed materially to the development of the model, and many of his ideas can be found in the article "A Model of a Communication System," cited above.

[115]These systems use the IBM 7094 computers at Project Mac and at the MIT Computation Center.

[116]Others who worked on earlier efforts at programming the simulation included Ernest Heau, Stephen Sachs and David Levine. Important work on the current simulation programs was done by Dr. John Nagle and by John Klensin. We are also indebted to Tom Van Vleck and Noel Morris, systems programmers at Project Mac, whose advice and

cooperation helped us cope with the complexities of the time-sharing system and with our own formidable programming task.

[117] We shall discuss the problems associated with the Comcom Leisure Study data in Chapter IV.

CHAPTER II

A STATISTICAL MODEL OF MEDIA EXPOSURE

CHAPTER II

A STATISTICAL MODEL OF MEDIA EXPOSURE

I. Overview[1]

In this chapter we present a detailed description of the first part of the Comcom model, viz., the part that deals with exposure to the media. Our description is not couched in formal mathematical terms but rather in a number of simple numerical examples.[2] Each of these is designed to illustrate, for the layman as well as the statistician, an important algorithm or simulation procedure employed in the media exposure part of the model. The last three sections of the chapter catalogue, in turn, the kinds of

---

[1] In this chapter, and in the one which follows it, we depart from the standard method for labelling sections and subsections employed in the rest of this thesis. Because of the scope and complexity of the material covered in Chapters II and III, we use outline form headings and subheadings to structure the presentation.

[2] Readers interested in the quantitative details of the Comcom model are referred to the formal mathematical description which appears in John F. Kramer's unpublished Ph.D. thesis, "Simulating the U.N. Information Campaign in Cincinnati, 1948" (Massachusetts Institute of Technology, 1969).

empirical data required as inputs for this part of the model, the output statistics that it produces, and the basic assumptions which underlie it. Hopefully, a concise exposition of these important features will be helpful to anyone seeking to ascertain whether the Comcom model of media exposure is a relevant one for his own work.

II. The Comcom model

The Comcom model is designed to simulate the flow of various kinds of messages in a nation. In its present state of development the model can be used to identify who in a nation is reached by the flow of mass media messages. This operation is carried out in what may be thought of as two "passes" through the computer.[1] The first pass (which we describe in this chapter) estimates each individual's probable exposure to the various media of communication represented in the simulation, and the second pass (which we describe in the next chapter) estimates each individual's likely exposure to different messages occurring in these media. Future plans call for a third pass through the

---

[1]The present version of the simulation consists of seven main programs. The first five programs are designed to perform a task distinctly different from that performed by the last two programs. We call attention to this difference by labelling the two groups of programs "pass I" and "pass II" respectively.

computer to modify this history by permitting word-of-mouth communication among individuals. The second and third passes will operate alternatively, allowing messages to diffuse through the media and then to be picked up by word of mouth, changing the conditions under which the next round of messages will be received. A fourth pass, currently under design, will produce graphical plots of time series statistics from simulated exposure records. At present, we have working models of passes I and II which have been developed on the IBM 7094-based time-sharing systems at M.I.T.'s Project MAC and Computation Center. The simulation programs --coded in MAD and FAP--have been designed for foreground operation on the digital computers at these installations so that we might take advantage of on-line user access features. In this thesis we test the first two passes of the simulation on the communications system of the Soviet Union during the Cuban missile crisis period and the aftermath of President Kennedy's assassination. Specifically, we use the simulation to assess what information about these two events reached various strata of the Soviet population through their own controlled mass media, through radio beamed from abroad, and through the Communist Party's agitational apparatus.

We now proceed to describe the major data handling techniques and computer procedures employed in the first pass of the simulation.

III. Pass I: Simulating media exposure

Pass I of the simulation combines all relevant aggregate information available on a real population to produce in the computer a couple of thousand hypothetical individuals that constitute as representative a sample population as possible. Simulated persons are assigned various demographic, social, and media-use attributes in such a way as to conform with the following information where is is known:

--the distribution of demographic and social traits over the population;

--the distribution of these same traits over the media's audiences;

--the distribution of individual frequencies of media exposure over the media's audiences and sub-audiences;

--the distribution of joint frequencies of multi-media exposure over the media's audiences and sub-audiences.

The end product of the first pass is a representative hypothetical population with habits of media use comparable to those discovered in the empirical research. These media-use habits are summarized for each person in the form of an estimate of his basic probability of exposure to an average issue of each simulated medium.

A. Distributing demographic and social traits over a sample computer population

A variety of characteristics can be represented in the simulation population. Ideally, after a researcher has decided which population characteristics are of interest to him, he would input for a simulation run census data or data from a panel survey giving the joing distribution of these characteristics over the population. But original source data of this kind, relating all the significant population variables to each other, is seldom available for a country and almost never available for closed societies like the Soviet Union. Generally, one of the following conditions prevails:

1. Data collected along the dimensions of interest to the researcher, either in a census or a representative survey, are published in tables of lesser dimensionality than the researcher desires for his simulation population. Because he does not have access to the original census or survey tapes, the researcher must construct the population from these tables of lesser dimensionality.

2. There is no one survey or census of the population along all the dimensions of interest to the researcher. He must therefore construct the simulation population from tables of lesser dimensionality published in several different sources. Each of these sources is based on a representative sample of the population.

3. Data collected along the dimensions of interest to the researcher, in a survey based on a representative sample, are such that cells in the table of dimensionality he desires are

too sparsely populated to provide accurate estimates of the underlying population. As a result, the researcher must collapse the full survey table to more densely populated subtables and construct the simulation population from these tables of lesser dimensionality.

4. There is no one survey or census of the population along all the dimensions of interest to the researcher. He must therefore construct the simulation population from the tables of lesser dimensionality published in several different sources. At least one of these sources is not based on a representative sample of the population and contains an interaction not specified in the sources that are based on representative samples of the population.

Regardless of which condition above obtains, the simulation problem is to establish appropriate dependences among the traits of interest in the sample computer population. For example, if we know from the Soviet census that 4 per cent of Russian adults have had more than 10 years of education, then the simulation must assign over 10 years of education to 4 per cent of the hypothetical persons in the sample computer population. It would not be difficult to assign such traits one at a time, but the problem becomes more complex when we attempt to account for <u>interactions</u> among traits. For example, suppose we know that as of January 1965 there were in the Soviet Union 11 million Party members and 6 million persons with more than 10 years of education. In this case not only must the simulation assign each of these two attributes to appropriate numbers of hypothetical persons in the sample computer population; it must do so in such a way as to produce a realistic joint assignment of these two attributes, i.e., a realistic estimate of how many Party members had over 10 years of education (and perhaps further, how many of those were males, urbanites, over 50 years of age, etc.).

Under conditions one through three above, the problem is to assign traits to simulated persons in a way that reproduces in the sample computer population all interactions, and <u>no other interactions</u>.[1] Under condition four above, the problem is to assign traits to simulated persons in a way that reproduces in the sample computer population all interactions estimated from census data and surveys over representative samples, at the same time reproducing as much as possible any other interactions estimated from surveys over unrepresentative samples, while producing no additional interactions. We first illustrate the simulation procedure developed for dealing with conditions one through three.

---

[1]When we have no data on the other possible interactions, and no reliable basis for estimating them, we are forced to this null hypothesis.

1. Estimating interactions from representative samples

a) Independent assignment of traits

Generally, we know the distribution of the population over each individual variable of interest. For example, suppose we know from the Soviet census that 50 per cent of Russian adults are male, 6 per cent are members of the Communist Party, and those in the 16 to 29 and the 50 plus age groups constitute one half and one fifth of the adult population respectively. If there were no interactions among these population traits, we could easily assign them one at a time, i.e., _independently_, to simulated persons in conformity with the known population distribution over each trait. The expected value of the population in any particular cell would then be just the relevant cross-product for that cell. Figure 2.1 shows the resulting percentages of the sample population which the computer would assign to each of twelve macro-types (male, Communist, over fifty years of age; female, Communist, over fifty years of age; etc.) in this way. But we know that there _are_ interactions among socially significant population traits, interactions which an independent assignment procedure of this kind ignores. Fortunately, we often have data on these interactions, linking as many as three or four of the

Sex:	Male 50%	Female 50%	
Age:	16-29 50%	30-49 30%,	50+ 20%
Political involvement:	Party member 6%	NonParty member 94%	

Census data

		16-29	30-49	50+			
Party member	Male	1.5%	.9%	.6%	50%	6%	Cell values resulting from the independent assignment of traits, i.e., from assuming no interactions among the traits
	Female	1.5%	.9%	.6%			
NonParty member	Male	23.5%	14.1%	9.4%	50%	94%	
	Female	23.5%	14.1%	9.4%			
		50%	30%	20%			

Fig. 2.1--Assigning population traits independently

important population characteristics at a time. We return to our example in order to illustrate the method developed for using this added information.

b) Iterative assignment of traits

Suppose that, in addition to Soviet census data describing the population's distribution over each variable of interest, we also have data on the interaction between two of these variables, "sex" and "political involvement," telling us that male Party members outnumber female Party members two to one. Depending on which of the first three conditions above obtain, this information could have come from the same census, from an independent source, or it may have been collapsed from a multi-dimensional sample survey in which the desired three-dimensional table was too sparsely populated to be usable. In any event, we do not have the multi-dimensional breakdown and the simulation problem is to assign population proportions to each of the twelve cells in a way that reflects the known population distributions over "sex," "age," and "political involvement," the known interaction between "sex" and "political involvement," and no other interactions. The method we use to estimate cell frequencies in the resulting three-dimensional table is based on a procedure developed by

Professor Frederick Mosteller and others.[1] First, we initialize the cells with the values implied by assuming there are no second-order or higher level interactions among the population traits, i.e., we calculate cross-products. Then, as illustrated in Figure 2.2, we multiplicatively adjust cell entries so that each row sum equals the value implied by the known second-order interaction. This, then, is an oversimplified example of a basic procedure employed at several points in the simulation which we hereafter refer to as the Mosteller technique. (The example is an oversimplified one because it usually requires at least several iterative applications of the multiplicative adjustment to rows and columns before a solution is obtained.) We are now ready to describe the application of this technique under condition four outlined above.

---

[1] See, e.g., W. Edwards Deming and Frederick F. Stephan, "On a Leas Squares Adjustment of a Sampled Frequency table when the Expected Marginal totals are known," The Annals of Mathematical Statistics, XI (1940), 427-44; Frederick F. Stephan, "An Iterative Method of Adjusting Sample Frequency Tables When Expected Marginal totals are known," The Annals of Mathematical Statistics, XIII (1942), 166-78; David T. Brown, "A Note on Approximations to Discrete Probability Distributions," Information and Control, II (1959), 386-92; Frederick Mosteller, "Association and Estimation in Contingency Tables," Journal of the American Statistical Association, LXIII, No. 321 (1968), 1-28.

		16-29	30-49	50+		
Party member	Male	1.5%	.9%	.6%	50%	6%
	Female	1.5%	.9%	.6%		
NonParty member	Male	23.5%	14.1%	9.4%	50%	94%
	Female	23.5%	14.1%	9.4%		
		50%	30%	20%		

Initialize the cells with the values implied by assuming no interactions among population traits, i.e, with cross-product values.

	Party member	NonParty member	
Male	4%	46%	50%
Female	2%	48%	50%
	6%	94%	

Data on the interaction between "sex" and "political involvement "

		16-29	30-49	50+		
Party member	Male	1.5%	.9%	.6%	3%	4%
	Female	1.5%	.9%	.6%	3%	2%
NonParty member	Male	23.5%	14.1%	9.4%	47%	46%
	Female	23.5%	14.1%	9.4%	47%	48%
		50%	30%	20%		

The <u>row sums</u> do not reflect the actual second-order <u>interaction</u>.

Multiply each entry in the first row by 4/3
" " " " " second " " 2/3
" " " " " third " " 46/47
" " " " " fourth " " 48/47

Perform a multiplicative adjustment.

		16-29	30-49	50+			
Party member	Male	2%	1.2%	.8%	4%	50%	6%
	Female	1%	.6%	.4%	2%		
NonParty member	Male	23%	13.8%	9.2%	46%	50%	94%
	Female	24%	14.4%	9.6%	48%		
		50%	30%	20%			

Cell values now reflect the known first- and second-order interactions and no others. (Typically, a solution of this kind is obtained only after the multiplicative adjustment has been applied at least several times, iteratively, to rows and columns.)

Fig. 2.2--Assigning population traits to reproduce an interaction estimated from a representative sample.

2. Estimating interactions from biased samples

Suppose that, in addition to Soviet census data describing the population's distribution over each variable of interest, we again have data on the interaction between two of these variables, this time "sex" and "age." Assume that these data come from a survey in which the age distribution of the sample differs from the age distribution of the overall population. The simulation problem, then,is to assign population proportions to each of the twelve cells in a way that exactly reproduces the population's known distributions over "sex," "age," and "political involvement," that reproduces as much as possible the interaction between "sex" and "age" implied in the biased sample, and that produces no other interactions.[1] We again

---

[1]John Kramer first pointed out to me a case in which this particular use of the Mosteller technique might be required. We have census reports describing the breakdown of the population in mainland China along several dimensions of interest. This data, more accurate than any other we have, is seldom published in tables of dimensionality greater than two or three, however, and is never published in some of the tables at these levels. We do have additional data, from interviews with Chinese refugees in Hong Kong, which measure some of the higher order interactions not displayed in Chinese census data. These measures are probably not completely accurate, however, because the interview sample has different marginal values along the traits of interest than does the Chinese population as a whole. If we were to do a Communist Chinese mass media simulation, our problem would be to assign proportions of the sample population to each of the simulation macro-types in a way that exactly reproduced the known census marginals for

use the Mosteller technique to estimate cell frequencies in the three dimensional table, but in a somewhat different fashion than before. This time we initialize the cells with the values implied by the interaction estimated from the biased sample, rather than with the cross-product values implied by the known population marginals. Then, as illustrated in Figure 2.3, we multiplicatively adjust cell entries until colum sums exactly equal the values implied by the known "age" marginals and row sums exactly reproduce the known "political involvement" and "sex" marginals. (Here again, because only two iterative applications of the multiplicative adjustment were required to obtain a solution in the example, it represents a somewhat oversimplified illustration of the way in which the Mosteller technique is used under condition four.) We are now ready to describe the technique in a more general fashion.

3. A generalized statement of how the Mosteller technique is applied

Suppose we wish to structure a simulation population alone n dimensions. The first step in the Mosteller

---

China, that reproduced as much as possible the higher order interactions present in the refugee sample, and that produced no other interactions.

	Male	Female	
Sex:	50%	50%	
Age:	16-29	30-49	50+
	50%	30%	20%

Political involvement:	Party member	NonParty member
	6%	94%

Census data

	16-29	30-49	50+	
Male	15%	25%	10%	50%
Female	10%	25%	15%	50%
	25%	50%	25%	

Survey data on the interaction between "sex" and "age", based on a sample with an unrepresentative age distribution

		16-29	30-49	50+		
Party member	Male	.9%	1.5%	.6%	50%	6%
	Female	.6%	1.5%	.9%		
NonParty member	Male	14.1%	23.5%	9.4%	50%	94%
	Female	9.4%	23.5%	14.1%		
		25%	50%	25%		

Initialize the cells with the values implied by the interaction present in the biased sample.

Multiply each entry in the first column by 50/25
" " " " " second " " 30/50
" " " " " third " " 20/25

Perform a multiplicative adjustment.

		16-29	30-49	50+		
Party member	Male	1.8%	.9%	.5%	53%	50%
	Female	1.2%	.9%	.7%		
NonParty member	Male	28.2%	14.1%	7.5%	47%	50%
	Female	18.8%	14.1%	11.3%		
		50%	30%	20%		

Row sums now violate the known "sex" marginals.

Multiply each entry in the first row by 50/53
" " " " " second " " 50/47
" " " " " third " 50/53
" " " " " fourth " 50/47

Perform another multiplicative adjustment.

		16-29	30-49	50+		
Party member	Male	1.7%	.8%	.5%	50%	6%
	Female	1.3%	1.0%	.7%		
NonParty member	Male	26.6%	13.3%	7.1%	50%	94%
	Female	20%	15%	12%		
		50%	30%	20%		

Cell values now reproduce all known marginals and reflect, as much as possible, the estimated second-order interaction. (Typically, a solution of this kind is obtained only after the multiplicative adjustment has been applied at least several times, iteratively, to rows and columns.)

Fig. 2.3--Assigning population traits to reproduce, as much as possible, an interaction estimated from a biased sample.

technique is to assign initial values to the cells of the n-dimensional table. If all our interaction data come either from a census or from samples representative of the real population (conditions one through three), we initialize the cells with cross-product values implied by the highest level complete set of known interactions. In the first case discussed above, for example, we knew all the first-order interactions--i.e., the population's distribution over each individual trait--so we initialized the twelve cells with cross-product values implies by these interactions. Had we known all the second-order interactions--i.e., "sex" x "age," "sex" x "politcal involvement," "age" x "political involvement"--we would have initialized cells with cross-product values implied by these interactions instead. On the other hand, if the highest order interactions on which we have data are those that have been estimated from a biased sample (condition four), we initialize cells with the cross-product values implied by these interactions and the highest level complete set of interactions that have been estimated from a census or from representative samples. In the second case discussed above, for example, we could estimate from a biased sample a second-order interaction--"sex" x "age" --on which we had no other data, so we initialized the twelve cells with the cross-product values implied by this interaction and the known "political involvement" marginals.

After we have initialized cells of the n-dimensional table in the appropriate way, the remainder of the Mosteller technique is the same for each of the four conditions outlined above. We perform multiplicative adjustments on the cell entries until they simultaneously reproduce all interactions estimated from representative population samples. Suppose, for example, that in addition to knowing all such interactions on a given level, say all the mth-order interactions (where m is less than n), we also know some of the interactions on the (m+1)th level. Each (m+1)th-order interaction specifies a set of values to which a corresponding set of linear arrays in n-space must sum. But we know that, at this point, all such sets of arrays sum either to the values implies by assuming no interactions on the (m+1)th level or to values obtained from a biased sample. Therefore, the next step in the simulation procedure is to multiplicatively adjust cross-product cell entries in the n-dimensional table until each array associated with an (m+1)th-order interaction sums to the value specified by that interaction, at the same time preserving all the known mth-order interactions. In the simple examples discussed above, we only had to perform this multiplicative adjustment once or twice. However, in more general cases we perform the adjustment procedure several times, iteratively. First, we apply it once to all the arrays associated with (m+1)th-order interactions. But on this initial round of adjustments one of two things generally happens. Either array sums that have been corrected by applying the procedure for a given (m+1)th-order interaction are perturbed by subsequent applications of the procedure for other (m+1)th-order interactions, or array sums associated with the pre-set mth-order interactions are perturbed. Therefore, the first round of adjustments generally guarantees correct sums only over the arrays associated with the last (m+1)th-order interaction for which the procedure is applied. As a result, multiplicative adjustments usually have to be applied iteratively to the set of arrays associated with all (m+1)th order interactions until cell entries in the n-dimensional table converge on values that simultaneously satisfy all known mth- and (m+1)th-order interactions.[1] This iterative adjustment procedure is

---

[1]A proof that they will always converge, if consistent subtables are being combined, is developed by Brown in "A Note on Approximations to Discrete Probability Distributions." Tables may be inconsistent in two different ways. An obvious inconsistency arises if two subtables are not identical, cell by cell, when they are collapsed along any dimension which they have in common. Consider the following two tables, for example:

then repeated for the known interactions on each succeeding level (m+2, m+3,...,n-1) until cell values in the

---

	Party member	NonParty member	
Male	4	46	50
Female	2	48	50

	Urban	Rural	
Male	3	45	48
Female	3	49	52

When they are collapsed along their common dimension, "sex," the resulting marginals are inconsistent. They are 50-50 in one case, 48-52 in the other. Whenever the Mosteller technique is applied in the present version of the simulation, all subtables are tested for this kind of contradiction. Inconsistent tables are called to the researcher's attention.

In the course of testing the simulation we discovered that another, more complex, type of inconsistency can also arise among tables. Consider the three tables below, for example:

	Party member	NonParty member	
Male	6	44	50
Female	0	50	50
	6	94	

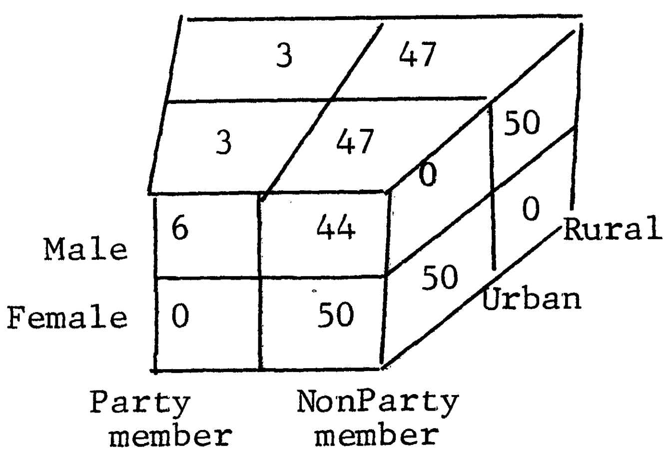
final n-dimensional table exactly reproduce all interactions estimated from representative population samples. Accordingly,

---

	Urban	Rural	
Male	0	50	50
Female	50	0	50
	50	50	

	Urban	Rural	
Party member	3	3	6
NonParty member	47	47	94
	50	50	

Although these tables are obviously consistent in the first sense (i.e., on any common dimension of a pair of tables, corresponding marginals are equal), they are inconsistent in a more subtle way, as illustrated below:



	Urban	Rural	
Male Party member	0	6	6
Male NonParty member	0	44	44
Female Party member	0	0	0
Female NonParty member	50,47	0,3	50
	50	50	

The three two-dimensional tables imply two possible sets of values in the nonParty member, urban, female and the

the Mosteller technique may be thought of as an iteration within an iteration. In Figure 2.4 we present a flow diagram of the technique so that the reader may verify his understanding of this important simulation procedure.

4. Distributing Soviet demographic and social traits over a sample computer population

In the case of the Soviet simulation, some of the traits that we considered representing in the sample computer population included age, sex, nationality, language of media consumption, republic of residence, community size,

---

nonParty member, rural, female cells, either of which violates one of the tables. In our simulation runs, this kind of inconsistency arose only when the tables we input to the Mosteller procedure completely "enclosed" the final n-dimensional table. In the case described above, for example, the three two-dimensional tables completely enclose the space of the cube. More generally, we found this type of inconsistency arose only when each of the n dimensions in the final table appeared at least once in the subtables we were synthesizing. In the present version of the simulation we test all the subtables on a given level for this type of inconsistency by determining whether or not there is a feasible solution to the set of linear equations relating the cell values of the n-dimensional table to the values in the subtables. When there is no feasible solution, i.e., when subtables contradict each other in this more complex sense, the inconsistent subtables are called to the researcher's attention. He must then discard one or more subtables until the remaining set are consistent. We have not yet discovered a systematic method for eliminating such inconsistencies, as for example, one that would allow the researcher to discard as few subtables as possible. A more extended discussion of this question of convergence of the Mosteller technique can be found in Kramer's Ph.D. thesis.

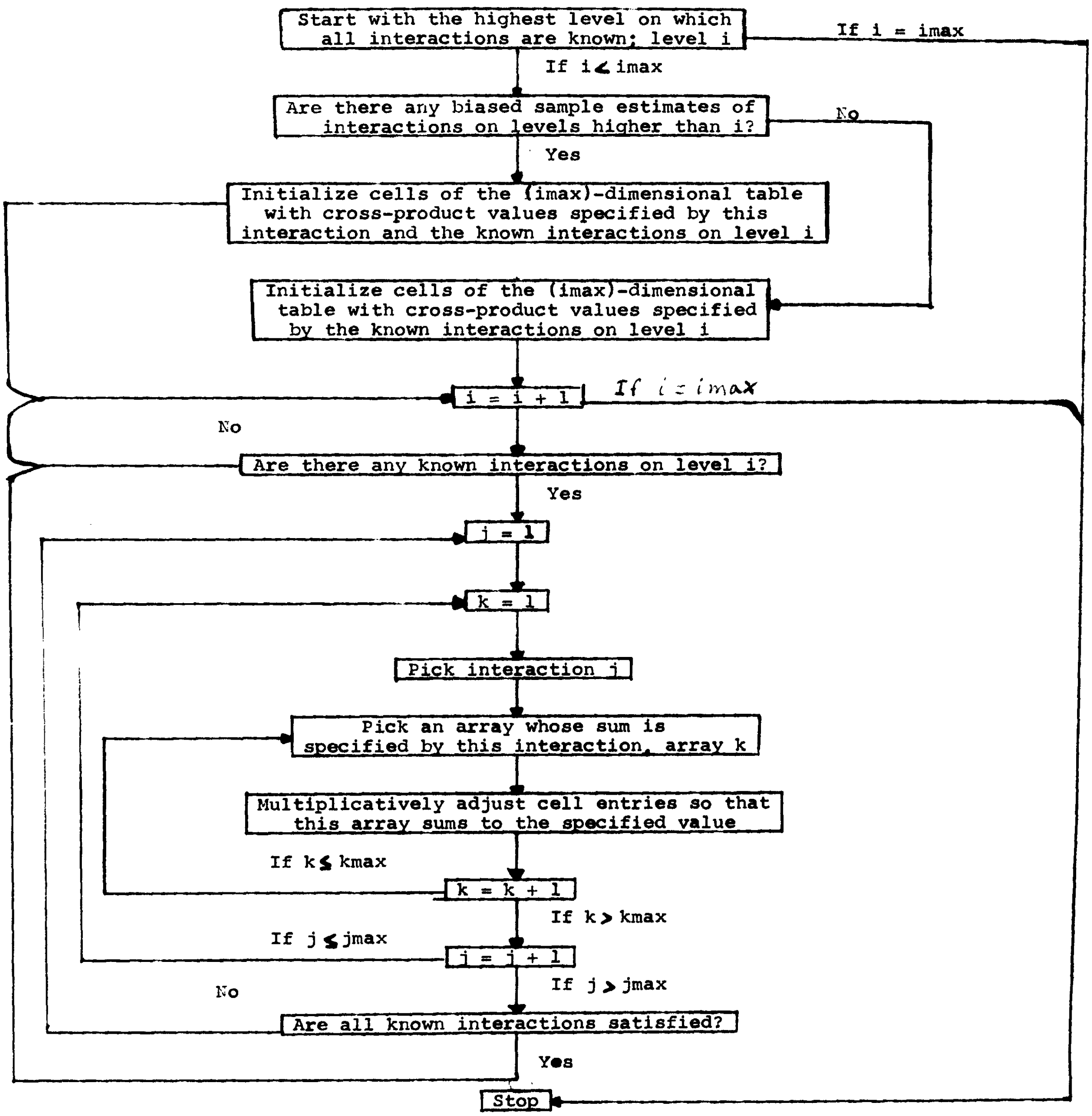


Fig. 2.4.--A flow diagram of the Mosteller technique

urban or rural residence, education, occupation, income, social stratum, political involvement, attitude toward the regime, and trustfulness or distrustfulness regarding media material. We had to rule out the use of many of these traits, in some cases because we lacked data on the distribution of a particular characteristic over the population or over audiences, in other cases because the particular characteristic was not considered to be one of the more significant correlates of communications behavior. But even if we had the requisite data on all these traits and did not want to pre-judge their relative influence on habits of media use, an important limitation of the simulation programs would have prevented us from representing such a large number of variables in the sample computer population.

The objective of pass I is to estimate each simulated individual's probability of being exposed to an average issue of each simulated medium. However, the fixed storage capacity which characterizes digital computers puts practical limitations on the number of media exposure probabilities which can be processed by the simulation programs in any given run. Since the number of media exposure probabilities that must be estimated and stored is a direct product of the number of persons and the number of media in the simulation, we are forced to assign a maximum allowable value to each of these parameters. As a result, the programs for pass I have been designed in such a way that they can process up to 3,000 simulated individuals' probabilities of being exposed to an average issue of each of up to 64 simulated media. But, as we shall soon show, one pre-condition for the calculation of any hypothetical person's media exposure probabilities is the accurate estimation of average media exposure probabilities for all persons of that type in the sample computer population. The average media exposure probabilities for a given type of person serve as guides to the appropriate assignment of individual media exposure probabilities to each person of that type. However, the stochastic assignment procedures which we use are not valid for a given type of person unless there exist a reasonable number of individuals of that type in the sample computer population. For this reason we have designed the simulation in such a way that it can distribute simulated persons over a maximum of 500 types or cells. With an upper limit of 3,000 persons, a larger allowable number of types would result in such a small number of persons of any given type in the sample computer population that the stochastic assignment of individual media exposure probabilities to persons of that type, based on the average media exposure probabilities for persons of that type, would have little validity.

The number of types of individuals represented in any population, i.e., the number of cells across which the population must be distributed, is just the product of the number of levels on each trait or dimension represented in the population. For the Soviet simulation, even if we had been satisfied to use only two levels on each trait of interest, we could not have represented more than eight of them in the sample computer population (2^9=512) without exceeding the maximum allowable number of cells. Thus, for a combination of reasons--data availability, intrinsic interest, and computer storage requirements--we finally decided to represent the following five attributes in the sample computer population: "age," "sex," "education," "political involvement," and "urban or rural residence." As a result, our sample computer population contained 96 different types of persons, each of whom was (1) either between the ages of 16 and 29, 30 and 49, or over 49; (2) either male or female; (3) either more than 10, between 7 and 10, between 4 and 7, or less than 4 years in school; (4) either a Party or nonParty member; and (5) either an urbanite or a ruralite.[1]

---

[1]We could not have 3,000 individuals in the sample computer population for the following reason: One of the simulation programs is designed in such a way that, for some combinations of less than 64 media and less than 500

In the Soviet simulation we were not working from original source data on the distribution of these five traits over the population. We had to reproduce it from available summaries of marginal distributions in order to construct a reasonable sample computer population. The prevailing circumstances were similar to those described in condition two above. We found that census data were collected by "sex," "age," "urban or rural residence" and "education," but not by "political involvement." However, other data from a representative sample were available on the breakdown of Party members and nonParty members by "sex," "age," and "education." Our specific problem was to combine a four-dimensional table estimated from census data--"sex" x "urban or rural residence" x "age" x "education"--with three two-dimensional tables estimated from another source--"political involvement" x "sex," "political

---

types or cells, it constrains the maximum simulation population to a size of less than 3,000. In our case (56 media and 96 cells), this constraint meant that we could only have 1,200 individuals in the sample computer population. But, because we had defined "political involvement" as membership in the Communist Party, this variable was very unevenly distributed over the Soviet population (and, therefore, over the sample computer population). As a result, 20 of the 48 cells representing Party members contained no simulated individuals at all. Because the 1,200 simulated individuals were distributed over 76 nonzero cells, the average cell population in these was 16. Therefore, a stochastic assignment procedure based on average cell probabilities probably was valid in most of the nonzero cells.

involvement" x "age," and "political involvement x "education"--in such a way as to construct a five-dimensional table--"sex" x "age" x "urban or rural residence" x "education" x "political involvement"--that reproduced the known distribution of each variable over the population, the interactions expressed in the four subtables, and no other interactions. We used the Mosteller technique to distribute a simulation population of 1,200 persons appropriately across the 96 cells of this five-dimensional table.[1] Thus, by employing aggregate statistical data and the iterative procedure described above, we were able to map important structural aspects of the Soviet population into a sample computer population. The result was a possible distribution of traits over the simulation population compatible which reported statistics on those traits.

B. Distributing the media's audiences across demographic and social strata of the sample computer population

Having distributed simulated individuals across the cells defined by important demographic and social traits (i.e., across population macro-types), our next task is to

[1]These 96 cells were just the cartesian products of the five dimensions.

distribute the media's audiences across these cells. For any medium this means that we must assign an appropriate audience figure to each cell. The overall population mean, which is just the average single-issue audience for a medium, can usually be obtained by some kind of transformation of an empirical statistic--a circulation figure in the case of print media, a set estimate in the case of electronic media. But simply assigning this overall population mean to each cell, without regard to other delimiting information about the composition of the media's audiences, would produce a uniform and therefore demonstrably incorrect distribution of probabilities across cells.[1] This kind of distortion can be reduced substantially by using whatever empirical audience breakdowns are available as additional criteria for assigning cell means.

1. Independent assignment of traits

Original source data on the composition of the media's audiences, relating all the significant population variables to each other, is seldom available. The information we generally have on the breakdown of audiences by demographic and social traits is of a summary nature at

[1]It would be equivalent to saying, for example, that illiterates read magazines as often as the well-educated.

best, indicating for the most part breakdowns by one variable at a time.[1] For example, suppose we estimate from survey data that half the average single-issue audience of a particular Soviet medium are male, 6 per cent are members of the Communist Party, and those in the 16 to 29 and 50-plus age groups each constitute one quarter of the audience. Suppose further that, based on a circulation figure, we estimate this audience comprises about 20 per cent of the adult Soviet population. If we assumed there were no interactions in the medium's audience among these population traits, then we could easily assign them one at a time, i.e., <u>independently</u>, to members of the simulated audience in conformity with the known distribution of each trait over the audience. The expected value of the audience figure for any particular cell would then be just the relevant cross-product for that cell. Figure 2.5 shows the resulting audience size with the computer would assign to each of the twelve cells in this way, assuming a simulation population of 1,000. But we know that there <u>are</u> interactions among socially significant population

---

[1] For example, it is possible to get data on the circulation of a magazine by region in the U.S.S.R., and it is also possible to assume something about the distribution of its circulation as between literates and illiterates. Data on circulation by literacy by region, however, is virtually non-existent.

Simulation population = 1,000

Estimated average single-issue audience = 20% x 1,000 = 200

Sex:	Male 50%	Female 50%	
Age:	16-29 25%	30-49 50%	50+ 25%
Political involvement:	Party member 6%	NonParty member 94%	

Survey data on the breakdown of the medium's audience by individual traits.

		16-29	30-49	50+		
Party member	Male	1.5	3	1.5	100	12
	Female	1.5	3	1.5		
NonParty member	Male	23.5	47	23.5	100	188
	Female	23.5	47	23.5		
		50	100	50	200	

Audience figures for each cell resulting from the independent assignment of traits to members of the sample computer audience, i.e., assuming no interactions among the traits.

	Party member	NonParty member	
Male	6	94	100
emale	6	94	100
	12	188	200

No interaction in the sample audience between "sex" and "political involvement" as a result of this independent assignment.

	Party member	NonParty member	
Male	8 (4%)	92 (46%)	100
Female	4 (2%)	96 (48%)	100
	12	188	200

Interaction in the sample audience between "sex" and "political involvement" if it were the same as the interaction in the population between these two traits.

Fig. 2.5.--Assigning audience traits independently

traits in the media's audiences, just as there are in the overall population. Generally speaking, however, we have better data on population interactions than we have on corresponding audience interactions. Therefore, unless we have data on a particular interaction in a medium's audience, we would like to have it approach, as closely as possible, the corresponding population interaction. We return to our example in order to illustrate how the Mosteller technique is applied for this purpose.

2. Iterative assignment of traits

Suppose that we are using the same simulation population described in Figures 2.1 through 2.3 above. Comparing this population with the audience described in Figure 2.5, we see that they break down identically by "sex" and "political involvement" but differently by "age." Although we have no survey data on second-order or higher level interactions in the medium's audience, we do have census data (Figure 2.2) indicating the existence of a second-order interaction in the population as a whole, between "sex" and "political involvement." But the independent assignment procedure illustrated in Figure 2.5 reflects only estimated first-order interactions in the medium's audience and, in fact, produces no interaction in the audience between "sex" and "political involvement." The simulation problem, then, is to establish a more realistic dependence between these two traits in the medium's audience. We have here a situation equivalent to condition number four described above. We wish to assign audience members to each of the twelve cells in a way that produces an interaction in the medium's audience between "sex" and "political involvement" as close as possible to that which we know exists in the overall population. At the same time, this assignment must exactly reproduce the audience size estimated from circulation data, the audience distributions over "sex," "age," and "political involvement" estimated from survey data, and no other interactions. As illustrated in Figure 2.6, we begin by initializing the cells with audience sizes that equal the values of the simulation population. Thus, our initial audience distribution contains the same interaction between "sex" and "political involvement" as does the simulation population. Because the simulation population breaks down by "sex" and "political involvement" in the same way as the medium's audience, the audience figures in each cell also reproduce these two first-order interactions. But we know that the medium's audience comprises only one-fifth of the population and that it breaks down by "age" differently than the simulation population. Therefore, as illustrated in

		16-29	30-49	50+	
Party member	Male	20	12	8	40
	Female	10	6	4	20
NonParty member	Male	230	138	92	460
	Female	240	144	96	480
		500	300	200	1000

Initialize the cells with audience figures that equal the values of the simulation population. Row sums now reflect the interaction in the population between "sex" and "political involvement".

Age:	16-29	30-49	50+
	25%	50%	25%

Estimated average single-issue audience = 200

Survey data indicate that the medium's audience differs from the overall population in these two respects.

		16-29	30-49	50+	
Party member	Male	20	12	8	40
	Female	10	6	4	20
NonParty member	Male	230	138	92	460
	Female	240	144	96	480
		500	300	200	1000
		50	100	50	200

Column sums do not reflect the actual audience breakdown by age, estimated from survey data, nor do they reflect the size of the medium's audience estimated from circulation data.

Multiply each entry in the first column by 50/500
" " " " " second " " 100/300
" " " " " third " " 50/200

Perform a multiplicative adjustment.

		16-29	30-49	50+	
Party member	Male	2	4	2	8
	Female	1	2	1	4
NonParty member	Male	23	46	23	92
	Female	24	48	24	96
		50	100	50	200

Cell values now reflect the estimated second-order interaction in the population, the estimated first-order interactions in the audience, the estimated audience size, and no other interactions. (Typically, a solution of this kind is obtained only after the multiplicative adjustment has been applied at least several times, iteratively, to rows and columns.)

Fig. 2.6.--Assigning audience traits to reproduce, as much as possible, an interaction known to exist in the population

Figure 2.6, we multiplicatively adjust cell entries so that each column sum equals the value implied by the estimated age distribution of the audience and all column sums total to the estimated audience size. In this simplified example, one application of the adjustment procedure is sufficient to produce cell values that satisfy these two requirements without perturbing the interaction in the audience between "sex" and "political involvement." We now proceed to describe this application of the Mosteller technique in a more general fashion.

3. A generalized statement of how the Mosteller technique is applied

Suppose we have structured our sample computer population along n dimensions. For any medium, then, the simulation problem is to establish realistic dependences among these n traits in its sample computer audience. To do this we distribute the sample audience across population cells in a way that reflects all interactions known to exist among cell-defining traits in the real audience, any additional interactions known to exist in the overall population, and no other interactions. When the data we have on the composition of the population related to higher order interactions or are more reliable than the data we have on the composition of the medium's audience (which is generally the case), we initialize cells of the n-dimensional audience table with the values of the simulation population. Then, we apply the multiplicative adjustment procedure to these cell entries in a manner similar to that described above (pp. 143-47), until they simultaneously satisfy all known interactions in the medium's audience. The resulting audience figures assigned to each cell thus reproduce all known interactions in the medium's audience, reproduce as much as possible all other known interactions in the population, and produce no additional interactions.[1] When the data we have on the composition of the population relates, for some reason, to lower order interactions or is less reliable than the data we have on the composition of a medium's audience, we initialize cells of the n-dimensional audience table with the cross-product values implied by the highest order complete set of interactions known for the medium's audience. We then apply the multiplicative adjustment procedure to those values until they also reflect any higher order interactions that may have been estimated for that medium's audience.

---

[1]In the simple case illustrated in Figure 2.6, the final cell entries exactly reproduce all these interactions. In a more general case, however, they would exactly reproduce only the known audience interactions. Any other interaction created in the sample computer audience would be biased away from zero toward the corresponding interaction in the sample computer population.

4. Distributing Soviet audiences across demographic and social strata of a sample computer population

In the Soviet simulation institutional facts determined how we defined the concepts of "issue" and "average single-issue audience" for each type of medium. For discontinuous media, such as newspapers and magazines, it was relatively simple to define the concept of issue. For example, if one of the messages of interest were part of an article in a particular edition of Pravda, then that message appeared in all copies of that edition. Therefore, we defined each edition of a newspaper or magazine as an issue of that publication, and we defined the average readership of any edition--i.e., some multiplicative function of a circulation estimate--as the average single-issue audience of that publication. However, it was more difficult to define the concept of issue for continuous media such as radio and television. In such media, one of the messages of interest might have been part of a program that had been presented unbrokenly for many hours, or part of a program that had been presented in discrete five minute newscasts. Nevertheless, in the Soviet simulation we also used a discrete definition of the concept of issue for continuous media, although in this case it was far more difficult to estimate the sizes of average single-issue audiences. For example, we defined all radio or television broadcasts presented during a particular period of the day (say, 8:00 A.M. to 12:00 noon) as an "issue" of that "station," and we defined the <u>total</u> listenership or viewership during that period of a typical day--i.e., some multiplicative function of a set estimate--as the average "single-issue" audience of that "station."

We defined the concept of issue for different types of Soviet media this way with one overriding objective in mind: to be able to represent in the simulation all the audiences of the Soviet mass media and the bulk of the audiences of externally-originated radiocasts, using no more than the sixty-four media allowed by the simulation programs. As it turned out, we were able to achieve this objective using fifty-six communications media in the Soviet simulation. They included eleven newspapers published on the central administrative level: <u>Pravda</u>, <u>Izvestia</u>, <u>Trud</u>, <u>Komsomolskaya pravda</u>, <u>Literaturnaya gazeta</u>, <u>Ekonomischeskaya gazeta</u>, <u>Selskaya zhizn</u>, <u>Nedelya</u>, <u>Krasnaya zvezda</u>, an aggregate newspaper representing all other papers on this level published three times a week, and one representing all others published twice a week; twelve newspapers published on the republic level: <u>Sovetskaya Rossia</u>, <u>Kazakhstanskaya pravda</u>, four aggregate papers representing, respectively, all Party-Government organs in the Central Asian, Transcaucasian, Baltic, and European republics, an aggregate newspaper for all republic level Komsomol papers published five times a week and one for all republic level Komsomol papers published three times a week, and four aggregate newspapers representing, respectively, all other republic level papers published five times, three times, twice, and once a week; seven newspapers on administrative levels below the republic level: one aggregate newspaper representing all Komsomol papers published on these levels and six aggregate newspapers representing, respectively, all other newspapers published on these levels in periodicities ranging from one to six days a week; two magazines: <u>Ogonyok</u> and <u>Krokodil</u>; four central radiocasts representing, respectively, all broadcasts emanating from Moscow Central Radio between the hours of 5:30 and 8:30 A.M., noon and 3 P.M., 6:00 and 9:30 P.M., and 9:30 P.M and 5:30 A.M.; four radiocasts emanating from administrative levels below the central level representing, respectively, all broadcasts emanating from these levels between the four time intervals just mentioned; two radiocasts representing, respectively, <u>all</u> domestic broadcasts between 8:30 A.M. and noon and between 3:00 and 6:00 P.M.; two central telecasts representing, respectively, all broadcasts emanating from Moscow Central Television between the hours of 11:00 A.M. and 6:00 P.M. and between 6:00 P.M. and midnight; two telecasts emanating from administrative levels below the central level representing, respectively, all broadcasts emanating from these levels between the two time intervals just mentioned; nine externally-originated radiocasts representing, respectively, all VOA transmissions to the Soviet Union between the hours of 4:00 and 8:00 A.M., 8:00 A.M. and 8:00 P.M., and 8:00 P.M. and 4:00 A.M., all BBC transmissions to the Soviet Union between these same time intervals, and all Radio Liberty transmissions to the Soviet Union between these time intervals; and finally, one medium representing the Soviet oral agitation network.

In the Soviet simulation we were working from secondary source data which summarized the distribution of demographic and social traits over the domestic and external media's audiences. We wished to use these data to produce reasonable population marginals and interactions in each simulated medium's audience. The prevailing circumstances were similar to those outlined in condition number four above. We knew the total daily circulation figures for most major Soviet newspapers and the approximate numbers of radio and television sets in various parts of the country. These figures provided a basis for estimating the total size of each medium's average single-issue audience. We also had data from the Comcom Leisure Study on the breakdown of various media's audiences by the individual dimensions of interest. However, these data were based on a biased and sparse sample of only a little over one hundred persons--Soviet refugees and visitors to Western Europe.[1] As a result, most cells of the five-dimensional table in which we had distributed our simulation population (see p. 151 above) contained too few members of any given medium's audience to provide a valid and reliable estimate of the actual audience composition. Therefore, we were forced to weight the sample and to collapse the five-dimensional survey table to five one-dimensional tables, each of which corresponded to a population trait. The cells in these collapsed subtables contained enough weighted audience members to provide fair estimates of the actual audience breakdowns on each trait. For any medium, then, we had an estimate of the size of its total audience and of its audience marginals by "sex," "age," "education," "urban or rural residence," and "political involvement." But we also had data, from the census and other sources, on higher order interactions in the Soviet population--interactions which we had already established in the sample computer population. We did not want to ignore this information in structuring the media's sample computer audiences. For any medium, then, our

---

[1]Problems of sample bias in the Comcom Leisure Study are discussed in Chapter IV.

problem was to distribute an audience, whose size had been estimated from circulation data, across cells in a way that exactly reproduced the audience marginals estimated from sparse Comcom Leisure Study data, that reproduced as much as possible the higher order interactions already present in the simulation population, and that produced no other interactions. For any medium, then, we initialized the cells of a five-dimensional audience table with the corresponding values of the sample computer population, and we used the Mosteller technique to adjust these values iteratively until they reproduced the estimated audience marginals for that medium. In this way we were able to map important structural aspects of the Soviet population into each medium's sample computer audience, at the same time mapping any known structural features of the medium's real world audience into its sample computer audience. The result was a possible distribution of traits over the simulated media's audiences compatible with reported population and audience breakdowns on those traits.

C. Distributing the media's audiences within demographic and social strata of the sample computer population (the problem of cumulation)

By distributing simulated individuals across all the cells in the sample computer population we have specified the cell sizes, i.e., the number of exposure probabilities that are to be assigned to each cell for any simulated medium. By distributing average audiences across all the cells in the sample computer population we have specified the cell means, i.e., the mean of the exposure probabilities that are to be assigned to each cell for any simulated medium. Each cell mean denotes the size of a medium's average single-issue audience among a group of people identically defined, such as young, educated, urban, male Party members. For any medium, then, cell means determine the distribution of exposure probabilities across cells and first moments for the eventual distributions of exposure probabilities within cells, but they do not specify the <u>shapes</u> of these within-cell distributions. However, for simulation purposes it is important to specify the shapes of the probability distributions in any cell because they determine the rate at which the media's audiences cumulate in that cell. The following example will bear this out.

Suppose that a particular cell mean for a medium is 0.22, i.e., that 22 per cent of the individuals in that cell are exposed to an average issue of the medium. Assume that the distribution of exposure probabilities in that cell forms a "spike" at the value 0.22. Then, all individuals in the cell have the same probability of being exposed to an average issue of the medium and the cumulative audiences, i.e., the number of individuals exposed at least once over one, two, and three issues comprise 22, 39, and 53 per cent of the cell population respectively.[1] Now, assume instead that the probability distribution in the cell forms two "spikes," one at 0.0 and the other at 1.0. Then, 79 per cent of the cell population is never exposed to an issue of the medium and 22 per cent are exposed to every issue, so the cumulative audience remains constant at 22 per cent of the cell population over any number of issues. Thus, the cumulation curve we obtain differs markedly depending on the shape we assume for the within-cell probability distribution. However, neither of the two assumptions we have made produces a realistic cumulation curve. It can be shown that the first assumption--that all individuals in a cell have an exposure probability equal to the cell mean--tends to overstate the rate of audience cumulation in that cell for most media.[2] The second assumption--

---

[1]Assuming an individual's probability of expsoure is the same for every issue, we make this computation as follows:

1 issue: $0.22 \times 100 = 22\%$

2 issues: $(0.22 + 0.78 \times 0.22)100 = 39\%$

3 issues: $(0.39 + 0.78 \times 0.78 \times 0.22)100 = 53\%$

[2]For example, consider these two simple cases: (1) Each individual in a cell has an average exposure

that all those in a cell who are exposed to the medium at all are exposed to every issue--does not allow for <u>any</u> audience cumulation in that cell. The simulation problem then is to specify, in each cell and in the overall population, probability distributions that produce realistic cumulation curves for each of the various media.

1. Estimating probability distributions for the population as a whole

The shape of the probability distribution in a cell for any medium determines the rate at which its audience cumulates in that cell. In fact, it is mathematically related to the shape of this cumulation curve.[1] The nature of this relationship is such that we can estimate the shape of the within-cell probability distribution for any medium from a knowledge of two "points" on its cumulation curve--the average sizes of its one- and two-issue audiences in

---

probability of 0.5 for a particular medium; (2) Half the individuals in a cell have an average exposure probability of 0.3 and half an average exposure probability of 0.7 for a particular medium. The following table summarizes the audience cumulations one would obtain with each of these formulations.

	Using the cell mean	Using a distribution
1 issue	50%	50%
2 issues	75%	71%
3 issues	87.5%	81.5%

[1]In the calculus, any point on a cumulation curve can be obtained by integrating its probability distribution

that cell. Unfortunately, while we know the average size of the one-issue audience for a medium in any cell (i.e., the specified mean), we seldom know the average size of its two-issue audience in that cell. Therefore, we cannot often use the mathematical relationship between a probability distribution and its cumulation curve as a basis for estimating the shapes of within-cell probability distributions. But we can use it to estimate the shapes of probability distributions that encompass the entire population, because we can usually estimate the sizes of the overall one- and two-issue audiences for a medium. Therefore, we have developed the following procedure for estimating the shape of an overall probability distribution for any medium: We use the one- and two-issue cumulation figures for a medium and the mathematical relationship mentioned above to estimate the two parameters of a beta function, and then we use the beta function to model a discrete probability distribution for the medium.[1] The

---

(i.e., its density function) over a corresponding probability interval. In the discrete case, any point on a cumulation curve can be obtained by taking the summation of its probability distribution over an appropriate number of probability values.

[1]At least four explicit ways of modelling distributions of exposure probabilities have been suggested in the literature. Alfred Politz proposed a third-degree polynomial (three parameters) in Life Study of Consumer Expenditures, Vol. II (New York: Alfred Politz Research, Inc., 1957). J. M. Agostini proposed weights at three or

shape of the distribution obtained for any medium this way is such as to reproduce the sizes of the one- and two-issue audiences for that medium and to reproduce, approximately, higher order cumulation figures for that medium.[1]

At this point we could assign individual exposure probabilities to each cell from an overall distribution estimated for each medium from cumulation data. It would

---

four discrete probability values (up to seven parameters) in "Les questions Directes sur les Habitudes des Lecteurs: Sont-Elles Vraiment si Mauvaises?" XV ESOMAR Conference, 1962. L. R. Frankel proposed weights at five discrete probability values fixed in advance (four parameters) in "Some Recent Developments in Market Research Methods," XV ESOMAR Conference, 1962. The use of a beta function (two parameters) to model distributions of exposure probabilities was first suggested by G. P. Hyett in "The Measurement of Readership," a paper which he read to a statistics seminar at the London School of Economics in 1958. Metheringham has applied Hyett's technique to the estimation of duplication between media in "Measuring the Net Cumulative Coverage of a Print Campaign." We have found the beta function quite useful for modelling probability distributions because it can assume a variety of shapes over a probability interval of 0.0 to 1.0. These shapes depend on the values specified for the two parameters of the beta function, a choice which the simulation leaves to the researcher.

[1]Using only the average and two-issue cumulative audiences to estimate parameters of a beta function does not, in general, produce the probability distribution that most closely fits higher order cumulation figures. In his thesis Kramer tests this use of the beta function model on Swedish and American magazine data. He finds that for many of the magazines a judicious choice of the two parameter values for the beta functions produces overall cumulation and frequency curves closely approximating the empirical curves.

be a relatively simple matter to make this assignment in such a fashion that each resulting within-cell distribution had the specified size and mean. Moreover, by assigning individual exposure probabilities to the various cells this way, we would combine two sets of constraining data for any medium--the cell means which reflect interactions among population traits in the medium's audience, and the overall probability distribution which fits cumulation data for the medium. As a result, the shape of the probability distribution created for a given medium in any cell would be such as to produce reasonable average and two-issue audiences for the medium in that cell. Nevertheless, we have chosen not to proceed in this fashion. Instead, we have developed a more complex method of assignment which incorporates an additional set of constraining data for any medium--three "constituent" probability distributions, each of which fits cumulation data for the medium within a particular class of its consumers.

2. Estimating probability distributions for classes of media consumers

The probability distribution that we estimate for any medium from cumulation data is a discrete distribution, i.e., it consists of probabilities located at finite probability intervals in varying densities. Therefore, it represents the distribution of the medium's audience across various exposure frequencies. As such, it reflects the fact that different individuals in a medium's audience have different habits of exposure with regard to that medium. Moreover, empirical data suggest that these differences are systematic, i.e., that the audience of a medium really consists of sub-audiences whose exposure processes are very different. For any medium these sub-audiences may form as many as three definable classes of consumers: a large group of essentially nonconsumers and another group which may or may not be divided between occasional and regular consumers. As a result, the overall distribution of exposure probabilities for a medium generally is not a single normal one or even a single skewed normal one. Instead, it is three constituent distributions, each representing one of these consumer classes and each very different in shape.[1]

---

[1]In the United States, for example, the probability distributions for a great number of media appear to take the form of relatively smooth distributions, but with large spikes very near 0.0 and, in some cases, similar spikes very near 1.0. The reason for this is that there are at least two, and sometimes three, distinct classes of consumers for these media. All media have a large group near 0.0 who are only exposed on the most random basis and a general class of consumers who are more systematically exposed. The latter can frequently be divided between

The mix of consumer classes varies greatly from one medium's audience to another and it is a criterion by which media are evaluated for various communications objectives.[1] In order to map this important structural feature into any simulated medium's audience, we must estimate the shapes of three probability distributions: one for nonconsumers, another for occasional consumers, and still another for regular consumers.[2] We need to

---

irregular or occasional consumers who are exposed to only some issues and regular or loyal consumers who are exposed to every or nearly every issue. In the most general case, then, the probability distribution for a medium is U-shaped, i.e., it is low for probability values near one-half and rises to peaks near 0.0 and 1.0. For some media, for example daily newspapers, these peaks are sharp and there is comparatively little of the distribution in the center; for others, e.g., monthly magazines, the curve is flatter. There is every reason to believe that similar structural patterns exist within the media's audiences in other countries as well.

[1]The mix of consumer types in a medium's audience is an important criterion for media planners. For some purposes the planner might want to construct a high frequency schedule, i.e., he might want to insert messages only in those media whose audiences contained large numbers or proportions of regular consumers, on whom a cumulative impression would be built. For other purposes the media planner might want to construct a high cumulative audience ("reach") schedule, i.e., he might want to insert messages only in those media whose audiences contained large numbers or proportions of occasional consumers.

[2]The three distributions can be employed not only to separate light, medium and heavy consumers of a medium but also to indicate their modes of acquiring the medium, as for example by distinguishing subscribers, newsstand buyers, and pass-along readers of magazines. This latter feature would be useful, for example, if conditions in a

substructure the audience of any medium this way at the population level because the mix of these consumer classes in a population determines the shape of the overall probability distribution and hence the rate of cumulative audience exposure in that population. We also need to substructure the audience of any medium this way at the cell level because cell-defining variables affect individual predispositions toward being a regular, occasional, or nonconsumer of that medium, and the mix of these consumer classes in a cell determines the shape of the within-cell probability distribution and hence the rate of cumulative audience exposure in that cell.[1]

---

particular communications scenario were to imply curtailment of newsstand buying or pass-along readership of magazines.

[1]As an example of the effect which the mix of consumer classes has on overall cumulation, consider a newspaper read by 1 million people each day. It might conceivably be read by the same 1 million people 365 times a year or by 365 million different people once a year. In one case the population is composed almost entirely of nonreaders and only a small part of it is ever exposed. In the other case the population consists solely of occasional readers; this time, even though the mean single-issue audience is the same, cumulative exposure increases linearly with successive issues until the entire population is exposed. (The actual mix of distributions in a population would, of course, lie somewhere between these extremes.) As an example of the effect which the mix of consumer classes has on cumulation in cells, consider a two-person cell in which each member has an 0.5 probability of reading an average issue of the newspaper. The cell thus contains only occasional readers and, after a relatively few issues of the newspaper, both would be exposed. Suppose, on the other hand, that the probabilities for

We can often estimate one- and two-issue exposure within the three sub-audiences of a medium as well as in its overall audience. For each medium, then, we use these estimates with beta functions to model a total distribution and three constituent distributions. Each of these distributions consists of a number of discrete probabilities located at intervals from 0.0 to 1.0 in approximately the density of a beta function. The parameters of the beta function used to represent any one of the distributions are computed as a function of the size of the simulation population and of the cumulation estimates (average one- and two-issue exposure) for the corresponding audience or sub-audience.[1] The modelling procedure specifies probabilities in such a way that for any medium

--the proportion of all the exposure probabilities in any constituent distribution equals the

---

the two individuals were 1.0 and 0.0. The cell is then split evenly between regular readers and nonreaders. Only half the cell would ever be exposed even though it had the same mean single-issue audience.

[1]There is an important limitation on the values of the one- and two-issue audiences which can be reproduced in a probability distribution modelled by the beta function. The mean proportion of the population exposed after two issues of a medium must be less than the difference between twice the mean single-issue audience and the square of the mean single-issue audience. In other words, a distribution in the form of a spike, located at the mean exposure probability for members of the audience or sub-audience, is the limiting shape which can be modelled by the beta distribution.

proportion of the real population in the corresponding sub-audience, and

--the shapes of the resulting distributions are such as to reproduce empirical cumulation estimates for each sub-audience and for the medium's overall audience.

For each of the four distributions we construct in this fashion (an overall distribution and its three constituent distributions) the beta function model requires

--the population proportion to which the distribution pertains,

--the average one-issue audience which the distribution must reproduce, and

--the average two-issue audience which the distribution must reproduce.

However, because of the constituent relationship among the four distributions, the researcher does not have to estimate all four sets of values. As illustrated in Figure 2.7, parameter values for any one of the distributions are a residual function of the parameter values for the other three. Given that 50 per cent of the population are non-consumers and 10 per cent are regular consumers of a hypothetical medium, then the remaining 40 per cent must fall into the residual category of occasional consumers. Similarly, the data table in Figure 2.7 implies that the average number of occasional consumers in the one- and two-issue audiences of the medium constitute 8 and 9.61 per cent of the population respectively. Figure 2.7 is a

Audience category \ Empirical estimates	as a percentage of the total population		
	size of category	average one-issue audience	average two-issue audience
Nonconsumers	50%	3.5%	6.650%
Regular consumers	10%	8.5%	11.600%
All	100%	20.0%	27.860%

Type of cumulation data that might by input to the beta modelling procedure for a hypothetical medium.

Nonconsumers

Number of probabilities	350	350	0	0	0	0	0	0	0	0	0
Value of probability	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0

Regular consumers

Number of probabilities	0	0	0	0	0	0	0	10	40	40	10
Value of probability	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0

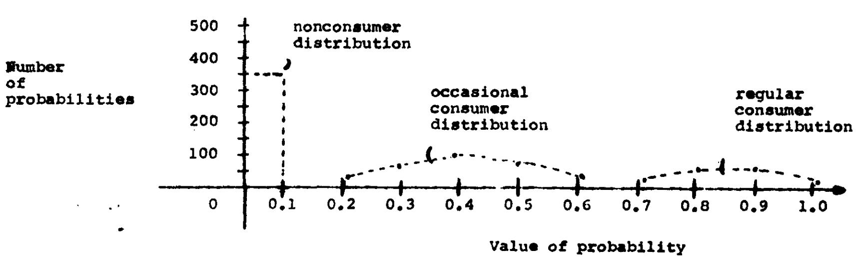
All

Number of probabilities	350	350	20	50	60	50	20	10	40	40	10
Value of probability	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0

Occasional consumers (a residual category)

Number of probabilities	0	0	20	50	60	50	20	0	0	0	0
Value of probability	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0

Types of distributions that might be generated by the procedure to fit this cumulation data.



In general, the resulting overall distribution of exposure probabilities for a medium will not be a single normal one or even a single skewed normal one.

Fig. 2.7.--Generating discrete probability distributions to fit culumation data

representative case because, typically, the researcher's most reliable empirical values will apply to the overall distribution and he will generally be able to estimate (or guess at) parameter values for sub-audience categories at the extremums.[1] It is easy to verify the fact that each distribution generated in our example fits the appropriate cumulation data, assuming a simulation population of 1,000. In the case of the regular consumer distribution, for example, there are a total of $10 + 40 + 40 + 10 = 100$ probabilities or 10 per cent of all the probabilities generated. The average single-issue audience implied by the distribution is just $10 \times 0.7 + 40 \times 0.8 + 40 \times 0.9 + 10 \times 1.0$ or 8.5 per cent of the sample computer population. The average two-issue audience implied by the distribution is just $8.5 + 10 \times 0.3 \times 0.7 + 40 \times 0.2 \times 0.8 + 40 \times 0.1 \times 0.9 + 10 \times 0.0 \times 1.0$ or 11.6 per cent of the sample computer population. The reader may verify for himself that each of the other distributions also fits the required cumulation data.

---

[1]For the case of a magazine, regular consumers might be the subscribers and their families. Nonconsumers might consist of persons outside the distribution area of the magazine, those choosing not to read the magazine, illiterates, etc. These two population groupings are what we refer to as subaudience categories at the extremums.

3. Assigning individual exposure probabilities to cells: the two-distribution case

The next task of the simulation is to assign individual exposure probabilities to cells, i.e., to determine how many and which probabilities should be assigned to each cell from each of the constituent distributions we have generated for a medium. These probabilities must be assigned to cells in such a way as to preserve two other assignments that have already been made: cell sizes and cell means. Nevertheless, if there were only two constituent distributions from which to draw probabilities for a medium, the solution to this problem would be quite simple. Suppose, for example, that we have distributed a simulation population of 100 persons across three cells so that there are 50, 30, and 20 persons in each cell and that, for a hypothetical medium, the mean exposure probability in each of these cells is 0.2, 0.4, and 0.3 respectively. Suppose further that one probability distribution for this medium consists of 70 occasional consumers with a mean of 0.1 and the other distribution consists of 30 regular consumers with a mean of 0.7. If we draw probabilities randomly without replacement from each of the distributions and are satisfied to reproduce cell means only in an expected value sense, then Figure 2.8 shows how, using two equations

Cell	1	2	3
population	50	30	20
mean exposure probability	.2	.4	.3

Two prior assignments which must be preserved

Distribution	occasional consumers	regular consumers
population	70	30
mean exposure probability	.1	.7

Two constituent distributions for a hypothetical medium

For each cell we can specify the number of probabilities to be drawn from each of two distributions to satisfy each of two constraints, using two equations in two unknowns as follows:

cell 1

$$.1x_1 + .7x_2 = 10 \qquad x_1 = 41\ 2/3$$
$$x_1 + x_2 = 50 \qquad x_1 = 8\ 1/3$$

cell 2

$$.1x_1 + .7x_2 = 12 \qquad x_1 = 15$$
$$x_1 + x_2 = 30 \qquad x_2 = 15$$

///

cell 3

$$.1x_1 + .7x_2 = 6 \qquad x_1 = 13\ 1/3$$
$$x_1 + x_2 = 20 \qquad x_2 = 6\ 2/3$$

These are the number of probabilities that would be assigned to each cell from each distribution, drawing randomly without replacement in order to present cell populations and reproduce cell means in an expected value sense.

where x_1 = the number of probabilities to be assigned to a cell from the distribution of occasional consumers, and x_2 = the number of probabilities to be assigned to a cell from the distribution of regular consumers.

$$50x.2 + 30x.4 + 20x.3 = 70x.1 + 30x.7 = 28$$

The resulting assignment also reproduces the expected value of the medium's overall audience.

Fig. 2.8.--Assigning individual exposure probabilities to cells from two constituent distributions to reproduce cell sizes and cell means for a hypothetical medium

in two unknowns, we can always specify for a cell the exact number of probabilities to be drawn randomly from each distribution.[1] It can be shown that the number of probabilities to be drawn from each distribution, as specified by the two equations, will always be positive if the mean exposure probability for the cell in question lies between the means of the high and low distributions. It can also be shown that the assignments across all cells resulting from this procedure will always use up the exact number of probabilities in each distribution.[2] Therefore, this assignment procedure also reproduces, in an expected value sense, the medium's overall audience, since that statistic is just the sum of products of the distribution sizes times the distribution means, or, equivalently, the sum of products of the cell sizes times the cell means.

---

[1]In principle, the result of this procedure would be that the expected value (over many draws) of the average of the probabilities assigned to any cell would equal the cell mean. In practice, however, the simulation must assign whole numbers of probabilities to each cell, so the fractional assignment values in Figure 2.8 would have to be rounded. As a result, this assingment procedure can only approximately reproduce most cell means, in an expected value sense.

[2]For these proofs the reader is referred to John F. Kramer, "The Three Distribution Case: How to Choose the Proper Number of Probabilities from Each Distribution When There Are Three Distributions," Comcom Simulation Memorandum No. 33 (Massachusetts Institute of Technology, January 27, 1966). (Mimeographed.)

4. Assigning individual exposure probabilities to cells: the three distribution case

When there are three constituent distributions from which to draw probabilities for a medium, the assignment problem is no longer straightforward. Suppose we are still working with the simulation population described above, but that we split the distribution of 70 occasional consumers into two distributions--50 nonconsumers with a mean exposure probability of .02 and 20 occasional consumers with a mean exposure probability of 0.3. As illustrated in Figure 2.9, we can never specify for a cell the exact number of probabilities to be drawn from each of three distributions to satisfy each of two constraints. In the absence of a third constraint, we obtain two equations in three unknowns for each cell. There are, of course, an infinite number of solutions to each such set of equations. In seeking a way around this problem we were, in fact, able to specify a third constraint, one which related the cell size, the cell mean, and the average of the probabilities in each of the three distributions.[1] However, the resulting assignment procedure, while it closely reproduced the mean exposure probability in cells having a

---

[1]For the derivation of this constraint see Kramer, "The Three Distribution Case."

Cell	1	2	3	
population	50	30	20	Two prior assignments which must be preserved
mean exposure probability	.2	.4	.3	

Distribution	nonconsumers	occasional consumers	regular consumers	
population	50	20	30	Three constituent distributions for a hypothetical medium
mean exposure probability	.02	.3	.7	

We can never specify for a cell the exact number of probabilities to be drawn from each of three distributions to satisfy each of two constraints, because the latter imply two equations in three unknowns, as follows:

$$\left.\begin{array}{l} .02x_1 + .3x_2 + .7x_3 = 10 \\ x_1 + x_2 + x_3 = 50 \end{array}\right\} \Longrightarrow ?$$

$$\left.\begin{array}{l} .02x_1 + .3x_2 + .7x_3 = 12 \\ x_1 + x_2 + x_3 = 30 \end{array}\right\} \Longrightarrow ?$$

$$\left.\begin{array}{l} .02x_1 + .3x_2 + .7x_3 = 6 \\ x_1 + x_2 + x_3 = 20 \end{array}\right\} \Longrightarrow ?$$

Each set of two equations in three unknowns has an infinite number of solutions.

where x_1 = the number of probabilities to be assigned to a cell from the distribution of nonconsumers

x_2 = the number of probabilities to be assigned to a cell from the distribution of occasional consumers

x_3 = the number of probabilities to be assigned to a cell from the distribution of regular consumers

Fig. 2.9.--Assigning individual exposure probabilities to cells from three distributions to reproduce cell sizes and cell means for a hypothetical medium

large number of individual probabilities, failed badly in this regard with smaller cells. Therefore, since we wished to incorporate three distributions for each medium in the simulation, we were forced to develop a different method of assigning individual exposure probabilities to cells--one which did not depend on the canonical forms described above.

We have developed the following simulation procedure for assigning individual exposure probabilities to cells from each of three constituent distributions: In assigning the first probability to the first cell, we draw randomly without replacement from the probability list (i.e., the discrete constituent distribution) whose mean is nearest the specified cell mean.[1] The required average of the

---

[1]Even though the three constituent distributions associated with a medium can (and usually do) overlap, we arbitrarily define boundaries between these distributions in the following way: the boundary between the low and middle distributions is the average of the mean probability of the low distribution and the mean probability of the middle distribution; the boundary between the middle and high distributions is the average of the mean probability of the middle distribution and the mean probability of the high distribution. The mean exposure probability for any cell thus falls in the range of one of the three distributions as defined by these boundaries. For example, if the boundary between the low and middle distributions were .20 and the mean of a cell were .15, then the cell mean would fall in the range of the low distribution. Therefore, we would draw randomly from the probabilities of the low distribution in assigning the first probability to this cell. At the same time, we would eliminate this probability from the list of low probabilities.

remaining probabilities that are to be assigned to this cell then is no longer equal to the original cell mean. It is lower if the first probability assigned to the cell happens to exceed the original cell mean; it is higher if the first probability assigned to the cell is less than the original cell mean. As a result, we assign the second probability to this cell from the constituent distribution whose mean is closest to the <u>new</u> average required for the yet-to-be assigned probabilities, again drawing randomly without replacement from the probability list for the distribution. This procedure is repeated until the number of individual exposure probabilities assigned to the first cell exactly equals the number of persons already assigned to that cell. The entire procedure is then repeated iteratively until all the individual exposure probabilities for a medium have been assigned to all the cells in the simulation. In the course of these assignments, one of the three probability lists for a medium may be exhausted. When this happens, subsequent probabilities are assigned to cells from whichever of the two remaining distributions has its mean nearest the required average of the yet-to-be assigned probabilities. (When two of the probability lists are exhausted, all subsequent probabilities are assigned from the one remaining distribution.) The simulation procedure we have been describing assigns exactly the right number of exposure probabilities to each cell and, in so doing, uses up the exact number of probabilities in each constituent distribution. In practice, we have found that the procedure also very nearly reproduces the specified means (1) in larger cells and (2) over groups of smaller cells.[1] Although it does not generally reproduce the means of individual smaller cells, it does much better with them than the canonical method referred to above.[2]

---

[1]The assignment procedure used in the present version of the simulation does fairly well in reproducing the means of larger cells for the following reason: Any probability assigned to a cell from a given distribution may range in value from 0.0 to 1.0; however, because of the kinds of distributions generated by the beta function model, the probability generally will have a value near the mean exposure probability of the distribution from which it is drawn. Since that distribution was chosen because its mean lay nearest the desired cell mean, a large number of draws of this kind reproduces the cell mean fairly well. Nevertheless, we could improve the accuracy of this procedure if we altered the present version of the simulation so that (1) boundaries between distributions were defined by _weighted_ averages of the distribution means and (2) the mean exposure probability for a distribution was re-calculated, and the appropriate boundaries re-defined, each time a probability was drawn from it. Then the _new_ distribution mean, as well as the new cell mean, would govern the choice of the distribution from which the next probability were to be drawn.

[2]The fact that the method does not faithfully reproduce the mean exposure probability in smaller cells is not too important. First, we are not likely to analyze the simulation output for individual small cells, but rather for groups of them and possibly for some individual large cells. The assignment process reproduces mean exposure probabilities in these two categories fairly well. Secondly,

5. Distributing Soviet audiences within demographic and social strata of a sample computer population

In the Soviet simulation we lacked sufficient data on the structure and cumulation of the media's audiences with which to test the accuracy of the beta function model against empirical measures. For each medium we had a fair estimate of the average single-issue audience, either from circulation data, set estimates, or the refugee interviews. From the latter we were also able to obtain, for each medium, estimates of the sizes of the regular consumer and non-consumer classes and the size of the average single-issue audience in each. But we could only make a very rough estimate of the size of the two-issue audience in each of these consumer classes and in the overall population. (These estimates were based on the sizes of single-issue audiences and on cumulation data for non Soviet media.) Using the beta function model with sparse cumulation data, we generated an overall probability distribution and three constituent distributions for each medium in the Soviet simulation. We then assigned individual exposure probabilities to the various cells from the constituent distributions for each medium, in the manner described

---

we obtained the means for individual cells using the Mosteller technique. As a result, they are only estimates, consistent with available audience breakdowns.

above. Thus, we were able, in an approximate fashion, to map two important kinds of media data into computer storage. First, we mapped the frequency distribution in each Soviet or external medium's audience into a corresponding sample computer audience. This resulted in a possible distribution of exposure frequencies over each simulated medium's audience compatible with reported audience breakdowns for that medium. Secondly, we mapped the consumer class structure of each Soviet or external medium's audience into a corresponding sample computer audience. This resulted in a possible joint distribution of cell-defining traits (and one noncell-defining trait) over each simulated medium's audience compatible with reported audience breakdowns for that medium.

By creating within-cell probability distributions for each simulated medium in the manner described above, we were able to link cell-defining variables with individual media consumption traits in a realistic way. For example, suppose that we had specified only two cell-defining variables, "education" and "urban or rural residence," and that the cell mean for Soviet listenership to the Voice of America had been 0.8 among urban intellectuals and 0.2 among rural illiterates. Under the assignment procedure we used, some rural illiterates could still have been assigned their exposure probabilities from the high distribution for VOA--the distribution of regular listeners. This might have been done, for example, to preserve the 0.2 mean in the rural illiterate cell if previous assignments, drawn from the nonlistener or occasional listener distribution, had left probabilities in this cell which averaged to less than 0.2. If a situation such as this had arisen, any rural illiterate designated a regular VOA listener would have been assigned his exposure probability from the <u>same</u> distribution as all urban intellectuals so classified.

6. The problem of noncell-defining variables

One other point ought to be made about within-cell probability distributions before we leave this section. For the Soviet simulation, as we have already mentioned, our cell-defining variables were "sex," "age," "education," "political involvement" and "urban or rural residence." We chose to define macro-types in the sample computer population by these dimensions because we were interested in their relative influence on communications behavior. However, two other attributes whose communications effects also interested us were "language of media consumption" and "republic of residence," and we would also have liked to distribute these attributes over our sample computer population. One way of doing this would have been to include them as cell-defining variables, but for two reasons we could not.

The principal reason was that the number of levels on either attribute (fifteen major nationality languages, fifteen union republics) when combined with the number of levels on each of the cell-defining attributes (2 sexes, 3 age intervals, 4 educational levels, 2 degrees of political involvement, 2 places of residence), would have produced 1,440 cells or population macro-types, and a data structure with this many cells would have far exceeded the computer storage capacity. The second reason why we could not include either of these attributes as cell-defining variables was that we lacked audience breakdowns on each for most of the media in the simulation. As a result, the only way we could have distributed our sample computer audiences across "language of media consumption" and "republic of residence" would have been to link our cell-defining variables with those two noncell-defining variables in an appropriate fashion. The technique for doing this in the present version of the simulation is the device of exposure probability distributions. We have already described how probabilities from these distributions are assigned to cells in such a way as to link cell-defining variables with one particular noncell-defining variable--"class of media consumer." As it happened, in order to distribute the attributes "language of media consumption" and "republic of residence" over our sample computer population in this fashion, we would have had to treat each of the levels on these two attributes as an additional medium in the simulation. But, with fifteen levels on each attribute and fifty-six real media already in the simulation, this approach would quickly have exhausted the maximum number of media allowed by the simulation programs. As a result, we were unable to incorporate "language of media consumption" and "republic of residence" in the Soviet simulation, even as noncell-defining variables. However, if it becomes possible to re-design the simulation programs so that they are able to process a much larger number of media in a single run than they can at present, it would appear that the device of exposure probability distributions could be used to link cell-defining variables not just with individual media consumption traits but with _any_ noncell-defining trait. We now proceed to show how this might be done.

Consider, for example, the attribute "republic of residence." In order to link this noncell-defining attribute with cell-defining attributes, we would treat each of its fifteen levels as we currently treat each medium in the simulation. First, we would distribute the population of each republic across cells just as we distribute each medium's audience across cells. For any republic, census figures would be used with the Mosteller technique to specify what proportion of the individuals in each cell live in that republic. Then, for each republic we would establish three probability distributions in the sample computer population, much as we do for each medium. Only in this case the probabilities would refer to "being present in the republic" rather than "being exposed to the medium." Corresponding to distributions associated with nonconsumers, occasional consumers, and regular consumers of a medium there might be distributions associated with those who never enter, those who occasionally visit, and those who permanently reside in a republic. However, the shapes of these distributions would not be related to anything like cumulation data. Instead, the nonvisitor and visitor distributions for any republic might be in the shapes of spikes at probability values of 0.00000001 and 0.1 respectively.[1] The proportions of the sample computer population assigned to the visitor and nonvisitor distributions for any republic would be a function of the time frame involved, and these two proportions would sum to the known proportion of the Soviet population residing outside that republic. The permanent resident distribution for any republic might be in the shape of a spike at 1.0, and the

---

[1]The simulation procedure developed for modelling probability distribution with beta functions cannot be used to model a distribution with a mean of 0.0.

proportion of the sample computer population assigned to it would just equal the known proportion of the Soviet population residing within that republic. Finally, in the same manner that we assigned individual exposure probabilities to cells from the three distributions for any medium, we would assign individual "presence probabilities" to cells from the three distributions for any republic. The resulting assignment would exactly reproduce the cell sizes and it would reproduce, as closely as possible, the cell means for any republic. In this way we could map the geographic distribution of the Soviet population into the sample computer population. The result would be a possible distribution of cell-defining traits over any republic's sample computer population compatible with all reported breakdowns of the republic's real world population.

D. Establishing joint distributions of the media's audiences across and within demographic and social strata of the sample computer population (the problem of duplication)

For every medium in the simulation we have allocated stable individual exposure probabilities to population cells such that within each cell they form a desired distribution around the specified mean. In doing so we employed

--aggregate data on population traits to determine how many exposure probabilities should be allocated to each cell,

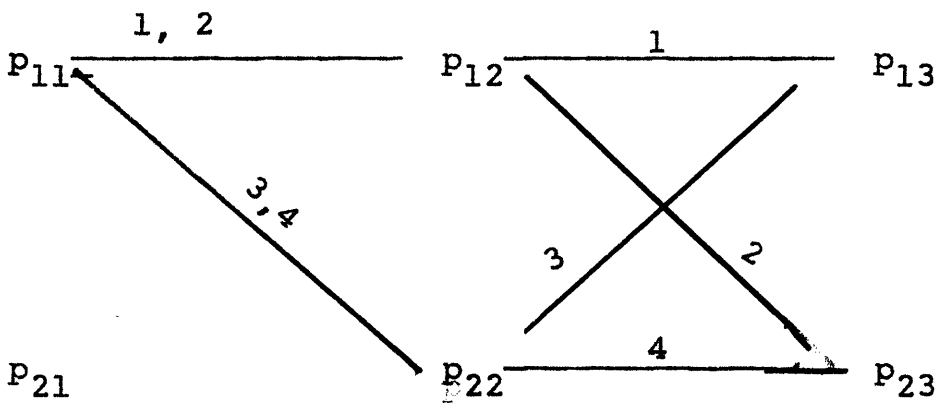
--empirical breakdowns of the media's audiences by these population traits to specify appropriate means for the exposure probabilities allocated to each cell, and

--available information on the structure and cumulation of the media's audiences to ascertain the shapes of the probability distributions in each cell and in the overall population.

The remaining task in pass I of the simulation is to create "persons" in each cell by <u>linking</u> individual exposure probabilities allocated to a cell for one medium with individual exposure probabilities allocated to that cell for other media. For example, if there were only three media in the simulation, Figure 2.10 illustrates four different ways that we could synthesize "persons" in a two-person cell. As the number of media in the simulation increases and as cell sizes become larger, the number of possible ways to perform this synthesis in any cell rapidly multiplies. In order to choose from these alternatives the linkages which establish realistic dependences among within-cell probability distributions, we need to consider an additional body of empirical information--the audience duplications among average issues of different media.[1]

---

[1]The simulation cannot accurately reproduce unduplicated audiences and cumulative net unduplicated audiences unless it can first reproduce accurately the duplication, or overlap, among average issues of pairs of media. This is because the net unduplicated audience reached by any group of media is a function of the pairwise audience duplications among them.



pij = the i-th exposure probability for medium j in a given cell

Fig. 2.10.--Four ways of linking exposure probabilities across three media to synthesize "persons" in a two-person cell

1. Nonrandom audience duplications

Generally speaking, the size of the audience shared by average issues of two or more media is nonrandom at the population level, i.e., it is something other than the product of the population means. For example, if medium A and medium B each reach 10 per cent of the population, a random model would imply that 1 per cent are reached by both, 18 per cent by one or the other, and 81 per cent by neither. In fact, however, the two media may each be reaching the same 10 per cent, leaving 90 per cent unreached, or there may be no duplication between them, so that 20 per cent are reached. Whatever the case may be, the data structure we have already built into the simulation assures that duplications which are nonrandom at the population level can often be accounted for by duplications which are random at the cell level. The following example will serve to illustrate this point.

Suppose that average issues of the Soviet women's magazines Rabotnica (Woman Worker) and Krestyanka (Peasant Woman) each reach about 1 per cent of the Russian population. Then, the expected value of the duplicated audience between both magazines is just 0.0100 per cent of the population if it is random at the population level. But, if we divide our simulation population only along the "sex" variable, and if duplicated audiences between the two magazines are random at the cell level, then we may easily obtain an overall duplicated audience that is nonrandom at the population level. Figure 2.11 below shows how cell means alone can account for this:

Cell means	Men	Women	All
Rabotnica	0.001	0.019	0.010
Krestyanka	0.002	0.018	0.010

Fig. 2.11--Audience duplications that are random at the cell level can produce an overall audience duplication that is nonrandom at the population level.

Readership of both magazines is rather small among Russian men. Therefore, the mean exposure probability for each medium in the "male" population cell is low and the variance arising in the three within-cell distributions for each medium also is fairly low. But both magazine audiences come predominantly from the "female" population cell which contains largely persons from the highest readership distribution for each medium. As a result, the product of the relatively large means in this cell (i.e., the expected random value of the duplicated audience in the cell) exceeds the product of the overall population means for the two magazines. Since the "female" cell contains about half the population, the expected random value of the duplicated audience in this cell alone exceeds the expected value of an overall audience duplication that is random at the population level. Assuming as many men as women in weighting the cells, the expected value of the overall duplicated audience that the simulation would produce between the two magazines by linking their cell-assigned probabilities randomly is just $\frac{1}{2}x(0.001 \times 0.002 + 0.019 \times 0.018) = 0.0172$ per cent of the population. If "sex" were the <u>only</u> variable significantly correlated with an individual's propensity to consume both <u>Rabotnica</u> and <u>Krestyanka</u>, then the sizes of the audiences shared by the two media in the male and the female cells separately would each, in fact, equal the expected random value. By linking cell-assigned probabilities for the two magazines randomly, the simulation would not only produce an overall duplicated audience between them that was nonrandom at the population level; it would also, in the expected value sense, produce the <u>correct</u> nonrandom duplication between them.[1]

The foregoing example shows how, when the media's audiences are decomposed into cells defined by many of the

---

[1]However, the titles of the two magazines suggest that "urban or rural residence" probably would be another variable that has some influence on an individual's propensity to consume both <u>Rabotnica</u> and <u>Krestyanka</u>.

variables significantly related to multi-media consumption, nonrandom duplications among them can be accounted for to a large extent by cell means.[1] However, we seldom operate on a population that has been cross-classified by <u>all</u> the variables significantly related to multi-media consumption. It may be that we lack data on the breakdown of the population by one or more of these variables. It may also be that some duplications cannot be fully explained by factors whose effects on individual exposure habits are independent from one medium to the next.[2] In either event, when some of

---

[1]If all duplications can be explained by independent factors, and if a population is analyzed with respect to all these determining factors, then the following hypothesis can be framed: "Audiences overlap randomly within homogeneous population groups." The validity of this hypothesis is supported in England by the work of E. J. Sainsbury, who used it with satisfactory results to estimate the net audiences of different media, and in Sweden by the results of the Vectu study, in which the hypothesis seemed to give good estimates of the net audiences of magazines, although based on limited empirical evidence and unsatisfactory population breakdowns. See, e.g., Caffyn and Sagovsky, "A Comparison of the Agostini and Sainsbury Methods," and Vectu, <u>Lasekretsundersökningen</u> (Stockholm, 1960). In the latter study differences between randomly added net audiences and empirical net audiences were found to diminish substantially with more refined population breakdowns.

[2]When a truly dependent relationship exists among consumers of one medium in combination with consumers of another, the strength of this dependence is that part which cannot be explained by random factors. In practice, it is difficult to find reasonable causes for such exposure dependencies. Hypothetically, an editor could stipulate that one might subscribe to one of his magazines only under the condition that one subscribes to another of his publications. An individual's reading of the two

the interactions among media are associated with other than cell-defining variables, means and variances of their within-cell probability distributions do not, by themselves, account completely for the nonrandom audience duplications among those media. Shared audiences are no longer random at the cell level and there arise among the media what we shall hereafter refer to as "residual" nonrandom audience duplications. The magnitude of this residual interaction between any pair of media, for example, is just the absolute value of the difference between (1) the pairwise empirical duplication and (2) the expected value of the pairwise duplication that would result if their cell-assigned exposure probabilities were linked randomly. From this definition it is obvious that any simulation procedure which links cell-assigned probabilities for one medium with cell-assigned probabilities for other media in a purely random fashion is valid only when there are no residual nonrandom audience duplications among them.

---

magazines can become dependent this way. As a somewhat less hypothetical example, there may exist a truly dependent relationship among readers of the three Party periodicals Kommunist, Partinaya zhizn, and Agitator, because saturation effects may dictate that people rarely, if ever, subscribe to more than two of them. But such irregular dependencies probably are rare. Many researchers consider it reasonable to assume that an individual is fully independent in his choice of various media and that only his own interests in a given medium determine whether or not he will be a consumer of that medium. See, e.g., Marberg, "A Visual Aid to Estimating Net Audiences."

To recapitulate, we have discussed the four logical possibilities summarized in Figure 2.12. It should be noted that, regardless of whether audience duplications are random or nonrandom at the population level, when some of the interactions among media are associated with other than cell-defining variables, the simulation cannot reproduce them in an expected value sense by randomly linking cell-assigned probabilities for the media involved. As a result, we have had to develop a more general technique for synthesizing persons in each population cell, one which is valid both when there are these residual interactions among media and when there are none.

a) Two media

The simulation problem is to link individual exposure probabilities assigned to any cell for one medium with individual exposure probabilities assigned to that cell for other media in such a way that all audience duplications known to exist among them are reproduced. Some of these audience duplications may be nonrandom--at the population level, the cell level, or both. Nevertheless, the solution to this problem is relatively straightforward for a pair of media. Suppose that we know the real world audience duplication between average issues of <u>Pravda</u>

ical audience cation is.	Random at the pop. level	Nonrandom at the pop. level	Interactions among media are associated with
Random at the cell level	Random linkage of within-cell probabilities is sufficient.	Random linkage of within-cell probabilities is sufficient.	cell-defining variables only
Nonrandom at the cell level	Nonrandom linkage of within-cell probabilities is required.	Nonrandom linkage of within-cell probabilities is required.	other than cell-defining variables

Fig. 2.12.--The correct linkage of within-cell exposure probabilities, as a function of the variables associated with interactions among the media

and <u>Rabotnica</u>, and that we have synthesized "persons" in each cell by randomly linking individual exposure probabilities for these two publications. We may now discover that the simulated audience duplication between the two media--the duplication accounted for, in an expected value sense, by cell-defining variables alone--differs from the empirical duplication. In other words, there may exist between the two media a residual nonrandom audience duplication, one which, by definition, is nonrandom at the cell level. Perhaps our simulated duplication is too low. We then have to resort to some after-the-fact improvisation in order to re-synthesize "persons" across the two media appropriately. The obvious procedure is to draw from each cell those persons making minimal contributions to duplication and to shift their across-media probability assignments in such a way that this contribution is augmented. In Figure 2.13 below we illustrate how this might be done within a two-person cell:

	Before adjustment		After adjustment	
Medium	<u>Pravda</u>	<u>Rabotnica</u>	<u>Pravda</u>	<u>Rabotnica</u>
Person				
1	0.9*	0.2	0.9	0.9
2	0.2	0.9	0.2	0.2

*Person #1 has been assigned an 0.9 probability of exposure to an average issue of <u>Pravda</u>

Fig. 2.13--Re-synthesizing persons to correct a pairwise audience duplication

The initial contribution to duplication from persons in the cell has an expected value of $\frac{1}{2} \times (0.9 \times 0.2 + 0.2 \times 0.9) = 0.180$ and their new contribution after re-synthesis has an expected value of $\frac{1}{2} \times (0.9 \times 0.9 + 0.2 \times 0.2) = 0.425$. We can perform a similar adjustment, cell by cell, until the sum of the audience duplications over all cells has been increased (or decreased) to the point where it equals the audience duplication known to exist between the two media at the population level.

b) Several media

In a more general case, however, when we attempt to deal with several media at a time, the solution to the duplication problem is not so straightforward. For example, suppose that in addition to knowing the real world audience duplication between average issues of _Pravda_ and _Rabotnica_, we also know the corresponding figures for _Pravda_ and _Krestyanka_, and for _Rabotnica_ and _Krestyanka_. After correcting the simulated audience duplication between _Pravda_ and _Rabotnica_ in the manner described above, we would have to check the simulated audience duplications between _Pravda_ and _Krestyanka_ and between _Rabotnica_ and _Krestyanka_ resulting from this procedure. If they were correct at the outset, there is no _a priori_ reason why they should remain so after the adjustment procedure. If they were incorrect originally, again there is no _a priori_ reason why the duplication adjustment between _Pravda_ and _Rabotnica_ should have corrected them. More than likely, the adjustment procedure would have to be carried out iteratively over all three media pairs. At best this would be a very time-consuming process, and at worst the three simulated audience duplications would never converge simultaneously on the three empirical duplications. In fact, we have found that working with individual probabilities this way it is virtually impossible to reproduce, at one and the same time, all the residual nonrandom pairwise audience duplications known to exist among any sizable group of media. As a result, we were finally forced to adopt a procedure for synthesizing "persons" in each cell which departs in two ways from an ideal solution to the duplication problem. In the present version of the simulation we perform this synthesis

--not across all media at once, but rather across no more than five media at a time,

--not by systematically linking individual within-cell exposure probabilities for these media, but rather by systematically linking their within-cell probability distributions.

2. Grouping the media in fivefold sets

The first step in this procedure is to group the media in the simulation into appropriate sets of five. For this purpose we produce a matrix of all the residual interactions known to exist among these media. For example, if there were ten media in the simulation, this matrix would have ten rows and ten columns. The number in, say, the second row and third column of the matrix would just be the square of the difference between (1) the actual audience shared by media 2 and 3 and (2) the expected value of the duplication that would result between these two media if their cell-assigned probabilities were linked randomly.[1] We use the values in this matrix as criteria for grouping all the media into fivefold sets, employing in the process a special-purpose clustering algorithm.[2]

---

[1]The same number would, of course, be in the third row and second column of this matrix, and all the diagonal values would be unity. We fill the matrix with squared values because we wish to group the media in sets of five according to the absolute values of their pairwise interactions (duplications) with other media. These interactions may be positive or negative. In producing this matrix we assume that any pair of media for which we lack empirical duplication data--either explicit information or implicit notions--have an audience duplication that is completely accounted for by cell-defining variables. This, of course, results in a zero entry in each of the two cells of the matrix corresponding to that media pair.

[2]Letter from Robert P. Abelson, Professor of Psychology, Yale University, New Haven, July 25, 1964.

The algorithm selects as the first four media in the first set, those four having the largest combined interaction (i.e., the greatest amount of residual nonrandom pairwise audience duplication) with the rest of the media in the matrix. The reason for this is as follows: Our ultimate objective is to link, in an appropriate nonrandom fashion, the within-cell probability distributions associated with those media, and only those media, appearing together in a fivefold set. But some media among which there exist residual nonrandom pairwise audience duplications will not appear together in any fivefold set. Since we shall not be linking their within-cell probability distributions in a nonrandom fashion, the expected values of the simulated pairwise duplications resulting among them will all be random at the cell level and will thus be different from their corresponding empirical duplications. In fact, a greater amount of this incorrect pairwise duplication would be produced by randomly linking within-cell distributions associated with those four media having the largest combined interaction with all the rest than by randomly linking within-cell distributions associated with any other four media.[1]

---

[1]Linking within-cell probability distributions for the four most "externally-bound" media randomly instead of in the appropriate nonrandom fashion increases, on the average, the amount of incorrect pairwise duplication produced between them and other media with which they are empirically "bound" but with which they also become randomly

That is why we include the four most "externally-bound" media in this first fivefold set.

The fifth medium which the clustering algorithm puts into the first fivefold set is the one having the largest interaction with the first four. To form the next group of five, the algoritm finds which of the remaining media in the matrix has the largest interaction with the media in the first group. It then removes from the group the medium having the smallest interaction with this newly identified medium and replaces it with the latter, forming a new group of five. The following rationale underlies this procedure: In linking within-cell probability distributions associated with the media in any given fivefold set, we shall be establishing constraints that may prevent us from linking media in subsequent fivefold sets in precisely the fashion we might desire.[1] Therefore, we want each new synthesis to be across those five media whose correct (or approximately correct) linkage will reproduce as much new residual nonrandom

---

linked. This increase exceeds the corresponding increase for any other four media that might be randomly linked by the simulation.

[1]Linkages between distributions established for prior fivefold sets may preclude (i.e., contradict) the linkages implied by pairwise duplication data for media in the current fivefold set. This may be due to inconsistent duplication data or to a restrictively small number of probabilities in a cell.

pairwise duplication as possible. That is why, in completing the first fivefold set and in forming subsequent sets, we incorporate the remaining media in descending order of their interaction with the media in the current set.

The clustering algorithm proceeds iteratively in the manner described above to form new groups until all the media among which residual nonrandom duplications are known to exist have been included in a fivefold set. Four of the media in each new fivefold set are thus carried over from the preceding set. In Figure 2.14 we show how this clustering algorithm would group ten media among which all the residual nonrandom pairwise audience duplications were known.

3. Establishing appropriate mixes of joint probability distributions across cells

Rather than synthesizing persons in each cell across all media in the simulation at once, we are now faced with the somewhat more manageable task of performing this synthesis across only the media in a fivefold group. For each such group we would like the resulting probability linkages to reproduce all known pairwise duplications among its five media, in an expected value sense.[1] The

---

[1]We may not have data on which to base estimates of <u>all</u> these pairwise duplications. Recall that, in the

Matrix of squared differences between empirical pairwise duplication and expected values of corresponding random-at-the-cell-level duplications

Medium / Medium	1	2	3	4	5	6	7	8	9	10	
1	//	.6	.7	.8	.5	.5	.7	.7	.6	.8	5.9
2	.6	//	.6	.1	.6	.1	.8	.1	.7	.2	3.8
3	.7	.6	//	.7	.8	.6	.5	.7	.8	.6	6.0
4	.8	.1	.7	//	.7	.1	.7	.2	.5	.1	3.9
5	.5	.6	.8	.7	//	.8	.5	.6	.6	.7	5.8
6	.5	.1	.6	.1	.8	//	.9	.1	.6	.1	3.8
7	.7	.8	.5	.7	.5	.9	//	.8	.7	.6	6.2
8	.7	.1	.7	.2	.6	.1	.8	//	.5	.1	3.8
9	.6	.7	.8	.5	.6	.6	.7	.5	//	.7	5.7
10	.8	.2	.6	.1	.7	.1	.6	.1	.7	//	3.9
	5.9	3.8	6.0	3.9	5.8	3.8	6.2	3.8	5.7	3.9	48.8

Group	Media				
1	7	3	1	5	4
2	7	3	1	5	9
3	7	3	5	9	6*
4	7	3	5	9	2
5	7	3	5	9	10
6	7	3	5	9	8

Fivefold media sets produced by the clustering algorithm on the basis of these residual nonrandom pairwise audience duplications

* In case of a "tie", the first medium to satisfy the algorithm is put in a new fivefold group. The same principle is used in removing a medium from an old fivefold group.

Fig. 2.14.--Grouping media in fivefold sets on the basis of the residual nonrandom pairwise audience duplications among them

empirical duplication between any pair of these media is, of course, determined by their joint probability distribution. Therefore, one way that the simulation can reproduce this duplication is by linking each exposure probability for one medium with an exposure probability for the other medium in such a way as to produce the appropriate joint probability distribution. For example, in Figure 2.15 we link individual exposure probabilities for two media in such a way as to construct a distribution of joint exposure probabilities that reproduces the known duplication between the media, in an expected value sense. But we wish to avoid this task in the simulation. A means of doing so lies in the fact that the empirical duplication between any pair of media is not describable solely in terms of the dependence between their overall distributions, as a function of their joint probability distribution. It can equally well be described in terms of the dependences among their constituent distributions, as a function of several joint probability distributions.

We mentioned earlier that empirical studies suggest the audience of any medium is structured in distinct sub-audiences--regular, occasional, and nonconsumers--each

---

absence of data on any given pairwise audience duplication, we assume it just equals the expected value of the corresponding random-at-the-cell-level audience duplication.

	Distribution for medium A			Distribution for medium B		
Number of probabilities	2	2	1	2	2	1
Value of probabilities	.1	.5	.8	.2	.4	.8

Pairwise empirical duplication = 20% of the population
Desired size of simulated audience duplication = 1 person

	Medium A	Medium B	Joint exposure probabilit
probability pairs that establish the correct joint probability distribution for media A and B	.8	.8	.64
	.4	.5	.20
	.4	.1	.04
	.2	.5	.10
	.2	.1	.02

Expected value of the simulated duplication produced by the joint distribution = 1.00 "person"

Fig. 2.15.--Linking individual exposure probabilities for two media to establish a joint distribution that reproduces their pairwise empirical duplication, in an expected value sense

of which can be thought of as a separate distribution of exposure probabilities. Cumulation data, or data on the audience overlap between successive issues of the same medium, then reflect the mix of these distributions--both in the population as a whole and in various cells of the population. We have already assured realism with respect to the audience shared by successive issues of any given medium in the simulation by (1) specifying three distributions of exposure probabilities having means and variances compatible with cumulation data for that medium, and (2) allocating individual probabilities to each cell from these distributions in such a way that the means of the resulting within-cell distributions are compatible with the known audience breakdowns for that medium. But empirical studies also suggest that the audience of various _groups_ of media is similarly structured in distinguishable sub-audiences--persons regularly exposed to all media in the group, persons regularly exposed to all but one medium in the group to which they are occasionally exposed, . . . persons rarely exposed to any medium in the group.[1] Each

---

[1]Audience studies have turned up high media consumption types--people highly exposed to a wide range of vehicles--and low media consumption types--people who have very low probabilities of exposure to any and all of the mass media. One of the less surprising findings, for example, is that people who do not read magazines also do

of these sub-audiences can be thought of as a distribution of joint exposure probabilities. Duplication data, i.e.,

---

not read books, because reading skill is required in both activities. But even when education and similar factors are held constant, interrelations between various kinds of audience behavior are observed. Paul F. Lazarsfeld, enumerating some of these relationships in an article entitled "Audience Research: which appears in Reader in Public Opinion and Communication, edited by Berelson and Janowitz, pp. 337-46, cites the following: (1) People who listen to news commentators on the radio are also more likely to read news magazines and in smaller towns to subscribe to the Sunday edition of metropolitan newspapers; (2) People who read the more serious type of magazine are more likely to listen to the more serious type of radio program; (3) Women who listen a great deal to the radio during the day also listen more during the evening; (4) Women who are interested in the "true fiction" type of magazine are also more interested in daytime serials and prefer the romantic type of movies; (5) People who never go to the movies at all are also less likely to listen to the radio; (6) If a book has been turned into a movie the people who have read the book are more likely to see the movie and vice versa. Studies on the interrelations between television viewing and other kinds of audience behavior indicate that television viewers are more likely to read the popular press with its lighter, shorter material and less likely to read the more serious papers. They are also more likely to read items actually dealt with in TV programs and to read a greater range and variety of press items. It appears that in the long term, television viewing increases slightly the reading of daily and Sunday papers at the expense of weekly and monthly magazines. See, e.g., William A. Belson, "The Effects of Television on the Reading and Buying of Newspapers and Magazines," Public Opinion Quarterly, XXV, No. 3 (1961), 366-81. The results of numerous studies indicate that television viewing decreases the number of books read by both children and adults. See, e.g., Himmelweit, Oppenheim, and Vince, Television and the Child; Schramm, Lyle, and Parker, Television in the Lives of Our Children; Bogart, The Age of Television; Belson, "Effects of Television on Interests"; Furu, Television and Children's Life; Parker, "The Effects of Television." Finally, research in the U. S., Chile, Turkey, and Colombia indicate data on the audience overlap among average issues of different media, then reflect the mix of these joint probability distributions--both in the overall population and within various substrata of the population. Therefore, in order to assure realism with respect to the audiences shared by average issues of the different media in a fivefold group, we must (1) specify a mix of joint probability distributions in the overall population that is compatible with the known pairwise duplications among these media, and (2) link within-cell distributions for the media in such a way as to reproduce this mix, as closely as possible, in each cell.

a) Two media: The two-distribution case

The first problem is to specify a mix of joint probability distributions in the overall population that is compatible with the known pairwise duplications among

---

that the general pattern of overlapping audiences for the mass media is worldwide. This pattern, in which exposure to one medium is positively related to exposure to other media, generally produces high intercorrelations in exposure to the five mass media--newspapers, magazines, films, radio, and television. See, e.g., Roy E. Carter, Jr. and Orlando Sepulveda, "Some Patterns of Mass Media Use in Santiago de Chile," Journalism Quarterly, LVI (1964), 216-24; Daniel Lerner, "Literacy and Initiative in Village Development," in Rural Development Research Report (Cambridge: M.I.T. Center for International Studies, 1964); Rogers, "Mass Media Exposure."

the media in a fivefold group. We begin with any pair of these media. The empirical duplication between them can be expressed as a function of several joint probability distributions. Each of these is just a statistical representation of one of the sub-audiences for the media pair, such as persons regularly exposed to both media, persons regularly exposed to one medium but only occasionally exposed to the other, etc. By establishing an appropriate mix of these joint probability distributions in the overall population, the simulation can reproduce the empirical duplication between the two media, in an expected value sense. Moreover, the simulation can almost always obtain this mix by randomly pairing an appropriate number of exposure probabilities from each of the possible combinations of constituent distributions associated with the media. We now proceed to show how this is done.

The simulation problem is to establish a mix of joint probability distributions in the overall population, for a given pair of media, such that (1) the size of each constituent distribution is preserved and (2) the expected values of the duplications produced by these joint distributions sum to the value of the empirical duplication between the two media. When there are only two constituent distributions associated with each medium, the solution is quite simple. For example, suppose that

14.6 per cent of the real world population are in the average audience shared by two hypothetical media, that the overall probability distribution for one medium contains 70 occasional consumers with a mean exposure probability of 0.10 and 30 regular consumers with a mean of 0.70, and that the overall distribution for the other medium contains 60 occasional consumers with a mean of 0.15 and 40 regular consumers with a mean of 0.80. If we pair probabilities from each of the four possible combinations of constituent distributions randomly and are satisfied to reproduce the empirical duplication only in an expected value sense, then Figure 2.16 shows how, using four equations in four unknowns, we can specify an appropriate mix of four joint probability distributions in the overall population. We immediately obtain three independent equations based on a knowledge of the size of each constituent distribution for each medium. We then form a fourth independent equation which expresses the duplication constraint.[1] Solving these four equations in four unknowns, we obtain values of 50, 20,

---

[1]This equation is based on two statistical principles: (1) Randomly linked probability-pairs from any two constituent distributions form a joint distribution whose mean is, in an expected value sense, the product of the means of those two distributions; (2) The contribution to duplication made by the persons represented in a joint probability distribution has an expected value which is just the product of the size and mean of that joint distribution.

Simulation population = 100

Pairwise empirical duplication =.146 x 100 = 14.6%

Simulation parameters that must be preserved

Distribution	Medium 1: Occasional consumers	Medium 1: Regular consumers	Medium 2: Occasional consumers	Medium 2: Regular consumers
population	70	30	60	40
mean exposure probability	.10	.70	.15	.80

Constituent distribution for two hypothetical media

Real world duplication between the two audiences

Medium 1 \ Medium 2	Not in the average audience	In the average audience	
Not in the average audience	45.6%	26.4%	72.0%
In the average audience	13.4%	14.6%	28.0%
	59.0%	41.0%	100.0%

Implied duplication between their distributions

Medium 1 \ Medium 2	Occasional consumers	Regular consumers	
Occasional consumers	x_1	xx_2	70
Regular consumers	x_3	x_4	30
	60	40	100

For each of four pairs of distributions we can specify the number of probabilities (x_1) to be linked randomly to satisfy each of four constraints, using four equations in four unknowns as follows:

$$\begin{aligned}
x_1 + x_2 &= 70\\
x_3 + x_4 &= 30\\
x_1 + x_3 &= 60\\
(.10)(.15)x_1 + (.10)(.80)x_2 + (.70)(.15)x_3 + (.70)(.80)x_4 &= 14.6
\end{aligned}$$

$$x_1 = 50 \quad x_2 = 20 \quad x_3 = 10 \quad x_4 = 20$$

Solving for the number of probabilities from each pair of distributions that must be linked randomly to preserve the distribution sizes and reproduce the pairwise empirical duplication

Fig. 2.16.--Linking two constituent distributions for one medium with two constituent distributions for another medium to reproduce their pairwise empirical duplication

10, and 20, which are just the sizes of four joint probability distributions that, between them, reproduce the empirical duplication, in an expected value sense, without violating the sizes of the constituent distributions.[1]

It can happen that there is no solution to a particular set of the four equations in four unknowns. This occurs when, and only when, a pairwise empirical duplication lies outside the range of duplications that are reproducible in an expected value sense, given the means and sizes of the constituent distributions for two media. In practice, if we were to find that the empirical duplication between two media fell outside this range, we would set the sizes of the four joint distributions equal to those values which came closest to reproducing this empirical duplication. For example, the maximum duplication that could be reproduced, in an expected value sense, by the distributions in our example would be that obtained by randomly linking all 30 probabilities from the regular consumer distribution for medium 1 with 30 of the

---

[1]In principle, the expected value of the duplication produced by probabilities from pairs of constituent distributions this way would equal the empirical duplication between the media. In practice, however, the simulation must link whole numbers of probabilities when synthesizing "persons" in each cell, but the equations in Figure 2.16 often produce fractional linkage values which then have to be rounded. As a result, this procedure for synthesizing "persons" can only <u>approximately</u> reproduce pairwise empirical duplications, in an expected value sense.

probabilities in the corresponding distribution for medium 2, by randomly linking the 10 remaining probabilities in the regular consumer distribution for medium 2 with 10 of the occasional consumer probabilities for medium 1, and by randomly linking the 60 remaining probabilities in the occasional consumer distribution for medium 1 with the 60 probabilities in the occasional consumer distribution for medium 2. Thus, the expected value of the maximum reproducible duplication would be 30 x 0.7 x 0.8 + 10 x 0.18 x 0.80 + 60 x 0.1 x 0.15 = 18.5% of the population. We can compute the expected value of the minimum reproducible duplication in a similar fashion.[1] If the empirical duplication had fallen outside the range of these two figures, say it had been 20 per cent of the population rather than 14.6 per cent, we would have set the sizes of the four joint distributions equal to 60, 10, 0 and 30 respectively.

b) Two media: The three-distribution case

When there are three constituent distributions associated with each medium, the duplication problem becomes more complex. Now, in order to reproduce a given

---

[1] In order to compute the expected values of maximum and minimum reproducible duplications, we use a theorem on maximizing or minimizing a sum of pairwise products that is formed from any two sets of numbers. This theorem and its proof may be found in Kramer's thesis.

empirical duplication we must establish the correct mix of nine joint probability distributions in the overall population. (From this point on, we shall frequently refer to the sizes of these joint distributions as probability-pair values.) The nine probability-pair values that we seek for any pair of media are pictured in Figure 2.17. We return to our original example to illustrate the method developed for computing them. Suppose we are still working with a simulation population of 100, but that from the two occasional consumer distributions we have split off two non-consumer distributions with sizes of 50 and 40 and with means of 0.02 and 0.05 respectively. The problem we now face is illustrated in Figure 2.18. From a knowledge of the number of probabilities in each constituent distribution we can obtain five independent equations. We can form a sixth independent equation by relating the duplication constraint to the distribution means. But we are unable to derive any other independent equations, and there are an infinite number of possible solutions to these six equations in nine unknowns. A linear programming algorithm can be used to ascertain one of these solutions, which is then termed a "feasible" solution.[1]

---

[1]For a description of linear programming algorithms, see n. *1, p. 10 above.

Medium 2

Medium 1		nonconsumers	occasional consumers	regular consumers
	nonconsumers	x_1	x_2	x_3
	occasional consumers	x_4	x_5	x_6
	regular consumers	x_7	x_8	x_9

x_i = the probability-pair values

Fig. 2.17.--Nine probability-pair values that must specify a mix of joint distributions which reproduces the empirical duplication

Simulation population = 100
Pairwise empirical duplication = .146 x 100 = 14.6%

Simulation parameters that must be preserved.

Distribution	Medium 1 Non-consumers	Medium 1 Occasional consumers	Medium 1 Regular consumers	Medium 2 Non-consumers	Medium 2 Occasional consumers	Medium 2 Regular consumers
population	50	20	30	40	20	40
mean exposure probability	.02	.30	.70	.05	.35	.80

Constituent distributions for two hypothetical media.

Real world duplication between the two audiences

Medium 1	Medium 2: Not in the average aud.	Medium 2: In the average aud.	
Not in the average aud.	45.6%	26.4%	72.0%
In the average aud.	13.4%	14.6%	28.0%
	59.0%	41.0%	100.0%

Implied duplication between their distributions

	Medium 2: Non-consumers	occasional consumers	regular consumers	
Non-consumers	x_1	x_2	x_3	50
Occasional consumers	x_4	x_5	x_6	20
Regular consumers	x_7	x_8	x_9	30
	40	20	40	100

We can never specify a unique number of probabilities from each of nine pairs of distributions whose random linkages will satisfy each of six constraints, because this implies six independent equations in nine unknowns as follows:

$$x_1 + x_2 + x_3 = 50$$
$$x_4 + x_5 + x_6 = 20$$
$$x_7 + x_8 + x_9 = 30$$
$$x_2 + x_5 + x_8 = 40$$
$$x_1 + x_2 + x_3 = 20$$
$$(.02)(.05)x_1 + (.02)(.35)x_2 + (.02)(.80)x_3 + (.30)(.05)x_4 + (.30)(.35)x_5 + (.30)(.80)x_6 + (.70)(.05)x_7 + (.70)(.35)x_8 + (.70)(.80)x_9 = 14.6$$

There are an infinite number of solutions to six equations in nine unknowns.

Fig. 2.18--Linking three constituent distributions for one medium with three constituent distributions for another medium to reproduce their pairwise empirical duplication.

There may be no feasible solution to a particular set of the six equations in nine unknowns. As in the two-distribution case, this occurs when a pairwise empirical duplication lies outside the range of duplications that can be reproduced, in an expected value sense, by the constituent distributions associated with two media. When this happens, we set the nine probability-pair values equal to those values that reproduce either the lowest or the highest possible duplication, whichever is closer to the empirical duplication. In the present version of the simulation, we utilize three constituent distributions for each medium, so for each pair of media in each fivefold group, either we arbitrarily set nine probability-pair values or we use a linear programming algorithm to compute them in the manner described above. The probability-pair values obtained in this way for any two media represent the sizes of nine joint probability distributions which, between them, reproduce the empirical duplication, as closely as possible, in an expected value sense.

c) Five media: The three-distribution case

For each pair of media in a fivefold group we have derived nine probability-pair values that specify a mix of joint distributions compatible with the known pairwise duplication. These nine probability-pair values correspond to the combinations formed by the three constituent distributions associated with each of the two media. However, the simulation problem is not to specify a separate mix of joint distributions for each pair of media in a fivefold group, but rather to specify one mix of joint distributions appropriate for all media pairs in that group, i.e., one that is simultaneously compatible with <u>all</u> the known pairwise duplications in the group. This requires the derivation of 3^5 or 243 appropriate probability-quintet values corresponding to the combinations formed by the three constituent distributions associated with each of the five media. We describe these probability-quintets in Figure 2.19.

It would appear that the 243 probability-quintet values for any fivefold media group could be computed by means of the Mosteller technique. For this purpose we would regard the probability-quintet values as entries in a five-dimensional table, each dimension corresponding to a medium in the group. The sizes of the constituent distributions would be marginal values on these dimensions, and the 10 sets of probability-pair values for the group would comprise 10 two-dimensional subtables. The Mosteller technique would then be used to construct a five-dimensional table of probability-quintet values

Medium	1	2	3	4	5	Probability-quintet value
Distribution	nonconsumer	nonconsumer	nonconsumer	nonconsumer	nonconsumer	x_1
	"	"	"	"	occasional consumer	x_2
	"	"	"	"	regular consumer	x_3
	"	"	"	occasional consumer	nonconsumer	x_4
	"	"	"	"	occasional consumer	x_5
	"	"	"	"	regular consumer	x_6
	"	"	"	regular consumer	nonconsumer	x_7
	"	"	"	"	occasional consumer	x_8
	"	"	"	"	regular consumer	x_9
	.	.	.	.	.	.
	.	.	.	.	.	.
	.	.	.	.	.	.
	regular consumer	regular consumer	regular consumer	regular consumer	nonconsumer consumer	x_{241}
	"	"	"	"	occasional consumer	x_{242}
	"	"	"	"	regular consumer	x_{243}

Fig. 2.19--The probability-quintets associated with a fivefold media group.

from 10 two-dimensional subtables of probability-pair values. There is one problem with this approach, however. The probability-pair values for any two media in a five-fold group may be inconsistent with the probability-pair values for other media pairs in that group. Such contradictions can arise either because duplication data are inconsistent or because feasible solutions generated by the linear programming algorithm are inconsistent. In either event, when there are inconsistencies among the 10 sets of probability-pair values associated with a fivefold media group, there is no set of 243 probability-quintet values compatible with all of them. As a result, the Mosteller technique cannot converge on a set of probability-quintet values compatible with all 10 sets of probability pair values.[1] However, the technique can be used to obtain

---

[1]The reason for this can best be understood in terms of a concrete example. Assume that the three sets of probability-pair values in the diagram below were obtained for each of three hypothetical media pairs by the method described above. Then each set of values reproduces the empirical duplication between a pair of media and is compatible with the sizes of their constituent distributions. But in order for the three sets of probability-pair values to be consistent among themselves, there must exist at least one set of 27 probability-triplet values compatible with all of them. These 27 values correspond to the combinations formed by the three constituent distributions associated with each of the three media. In the diagram below, the probability-triplet values are pictured as entries in the interior cells of a cube whose face entries are just the three sets of probability-pair values. From this diagram it can be seen that the three sets of probability-pair

a set of 243 probability-quintet values that are compatible with as many of the 10 sets or probability pair

values are inconsistent among themselves because they imply two cconflicting entries in at least one of the interior cells, i.e., two contradictory values for a particular probability-triplet.

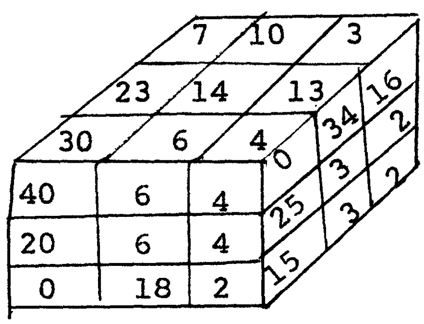
Medium 1	Medium 2			
nonusers	40	6	4	50
occasional users	20	6	4	30
regular users	0	18	2	20
	60	30	10	

Medium 1	Medium 3			
	0	34	16	50
	25	3	2	30
	15	3	2	20
	40	40	20	

Medium 2	Medium 3			
	30	23	7	60
	6	14	10	30
	4	3	3	10
	40	40	20	

Picturing these three sets of probability-pair values as the face entries on a cube,

Medium 1



Medium 3

Medium 2

it becomes evident that they imply two contradictory entries in at least one interior cell. This can be seen by unfolding the cube as follows:

	Medium 3			
Medium 2	0			40
	0			6
	0			4
Medium 1 Medium 2 25	30			20
				6
				4
Medium 2	0	0	0	0
				18
				2

<u>values as possible</u>. We can do this by giving a researcher the option of omitting from consideration as many sets of probability-pair values as necessary for the technique to converge. In the present version of the simulation the Mosteller technique is used this way to compute a set of 243 probability-quintet values for each five-fold group of media. The resulting set of values obtained for any group specifies a mix of joint distributions which reproduce, as closely as possible, all pairwise empirical duplications in the group except those associated with rejected sets of probability-pair values. As an example of this approach, we outline in Figure 2.20 the manner in which the Mosteller technique would be applied to a fivefold group of media for which there were four consistent sets of probability-pair values.

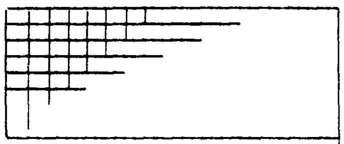
4. Establishing appropriate mixes of joint probability distributions within cells

For each fivefold media group we have computed 243 probability-quintet values that specify a mix of joint distributions compatible with many, if not all, of the known pairwise duplications in that group. Our objective now is to establish these mixes in the sample computer population. The way to do this for the five media in any

Distribution	nonconsumers	occasional consumers	regular consumers
Medium			
1	50	30	20
2	40	20	40
3	60	30	10
4	50	40	10
5	60	20	20

Marginals on each of five dimensions.

medium 1 x medium 2 x medium 3 x medium 4 x medium 5



Initialize the 243 cells with values impled by these 1st-order interactions, assuming no second-order or higher level interactions among the media.

Medium 2

Medium 1	Non-consumers	Occasional consumers	Regular consumers	
nonconsumers	20	12	18	50
occasional consumers	10	4	16	30
regular consumers	10	4	6	20
	40	20	40	

Medium 3

Medium 2	Non-consumers	Occasional consumers	Regular consumers	
nonconsumers	20	16	4	40
occasional consumers	15	4	1	20
regular consumers	25	10	5	40
	60	30	10	

Medium 4

Medium 3	Non-consumers	Occasional consumers	Regular consumers	
nonconsumers	25	25	10	60
occasional consumers	20	10	0	30
regular consumers	5	5	0	10
	50	40	10	

Medium 5

Medium 4	Non-consumers	Occasional consumers	Regular consumers	
nonconsumers	25	9	16	50
occasional consumers	28	8	4	40
regular consumers	7	3	0	10
	60	20	20	

Perform multiplicative adjustments iteratively until the 243 cell values reflect these second-order interactions as well as the known first-order interactions.

Fig. 2.20--Using the Mosteller technique to compute probability quintet values that reproduce four pairwise empirical duplications in a fivefold media group

group is by randomly linking exposure probabilities from each of its 243 combinations of constituent distributions in amounts specified by the corresponding probability-quintet values. But these random linkages must also preserve an assignment that has already been made by the simulation, viz., the assignment of individual exposure probabilities to various population cells. We cannot link exposure probabilities for one medium with exposure probabilities for another medium unless these probabilities have already been assigned to the same cell. Otherwise, the persons we synthesize will not be distributed realistically over the cell-defining variables, even though the exposure probabilities for individual media are. In order to assure that the only exposure probabilities we do link are those which have been assigned to the same cell, we have adopted the following procedure for establishing specified mixes of joint distributions in the sample computer population: We attempt to reproduce these mixes as closely as possible in each cell by appropriately linking within-cell probability distributions already established for the various media. We now proceed to describe how this is done.

First, exposure probabilities for those media which are not in any of the fivefold groups are randomly linked with one another in each cell.[1] They are also

[1]Recall that we only group in sets of five those media on which we have empirical data indicating that their

linked randomly, cell by cell, with exposure probabilities for the first medium in the first group of five. We then obtain a set of 9 probability-pair values for the first two media in this group by summing its 243 probability-quintet values over the other three media.[1] The simulation problem is to establish, as closely as possible in each cell, the mix of joint distributions specified for the first two media by this set of probability-pair values.[2] In order to do this in any cell we once again use the Mosteller technique. Each of the two media represents a dimension, the number of probabilities in a cell from each of their constituent distributions represent marginal

---

duplication with at least one other medium is nonrandom at the cell level.

[1]The resulting set of probability-pair values will approximately equal the set originally computed for the first two media if, and only if, the original set was not one of those that had to be rejected for the Mosteller technique to converge.

[2]Unfortunately, two factors prevent us from doing this in anything but a very imprecise fashion: First, there may be fewer than 9 probabilities in a cell for each medium. When this happens we can approximate only in the roughest way a mix of joint distributions specified by 9 probability-pair values. Secondly, the distribution of exposure probabilities for a medium at the individual cell level generally differs from its distribution at the population level. The result is that a mix of joint distributions which is reproducible at the population level, given the sizes of the constituent distributions for the two media, may not be reproducible at the cell level, given the number of probabilities that have been assigned to the cell from each of these distributions.

values on these dimensions, and the set of 9 probability-pair values for the two media represent initial values in a two-dimensional table. We use the Mosteller technique to bias these initial values in such a way that the 9 new probability-pair values are consistent with the two marginal distributions, i.e., with the number of probabilities in the cell from each medium's constituent distributions.[1] For the first two media in the first fivefold group the Mosteller technique is used this way to compute 9 probability-pair values for each cell in the simulation. In any cell, exposure probabilities from each combination of constituent distributions for the two media are then linked randomly in amounts corresponding to the set of probability-pair values obtained for that cell. This entire procedure is then repeated iteratively in order to link exposure probabilities for the first two media with exposure probabilities for the third medium in the set of five, to link exposure probabilities for the first three media with exposure probabilities for the fourth medium in the set of five, etc., until exposure probabilities for

---

[1]This procedure generally produces nonintegral probability-pair values for a cell, but we can only link probabilities from the various combinations of constituent distributions in integral amounts. Therefore, we use a Monte Carlo rounding procedure which converts these fractions to whole numbers while keeping them consistent with the sizes of the constituent distributions in the cell.

all the media appearing in fivefold groups have been linked. By synthesizing persons across each fivefold media group this way we establish, in the overall population and (to a lesser extent) in individual cells, mixes of joint probability distributions that reproduce, as closely as possible, many of the known pairwise duplications among the media in the simulation. Figure 2.21 outlines the manner in which the procedure would be applied to a given cell for a pair of media.

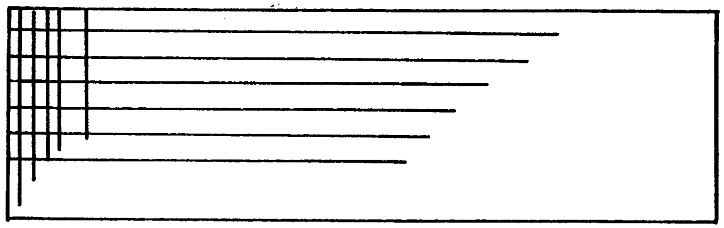
E. Establishing joint distributions of Soviet audiences across and within demographic and social strata of a sample computer population

In the Soviet simulation we had very little data on the audience duplications among most media, other than the general knowledge that people highly exposed to one medium, and to specific kinds of news in that medium, were likely to be highly exposed to other media, and to the same kinds of news in those media. However, as we explained above, it seemed reasonable to expect that this type of duplication effect would be rather well accounted for by the dimensions of the simulation population, i.e., the demographic and social characteristics of audiences, rather than by other factors. Therefore, we did not attempt to derive empirical estimates of these audience

Distribution Medium	nonconsumers	occasional consumers	regular consumers
1	8	7	5
2	14	4	2

The marginal distributions of two dimensions in a given cell.

Medium 1 x Medium 2 x Medium 3 x Medium 4 x Medium 5



The 243 probability-quintet values for that fivefold media group which contains media 1 and 2.

Medium 1	Medium 2: nonconsumers	occasional consumers	regular consumers	
nonconsumers	300	240	60	600
occasional consumers	150	120	30	300
regular consumers	50	40	10	100
	500	400	100	

9 probability-pair values obtained for media 1 and 2 by summing the 243 probability-quintet values over media 3, 4, and 5; These are the initial values to which the Mosteller technique is applied.

Fig. 2.21--Using the Mosteller technique to establish the desired mix of joint distributions in a cell.

Perform a series of multiplicative adjustments

Medium 1		Medium 2: nonconsumers	Medium 2: occasional consumers	Medium 2: regular consumers	
	nonconsumers	5.6	1.6	.8	8
	occasional consumers	4.9	1.4	.7	7
	regular consumers	3.5	1.0	.5	5
		14	4	2	

The new probability-pair values for media 1 and 2 conform to the sizes of the constituent distributions in the cell and reflect the interactions between media 1 & 2 implicit in the old probability-pair values.

Medium 1		Medium 2: nonconsumers	Medium 2: occasional consumers	Medium 2: regular consumers	
	nonconsumers	5	2	1	8
	occasional consumers	5	1	1	7
	regular consumers	4	1	0	5
		14	4	2	

After a specialized rounding procedure, the integral probability-pair values still conform to the sizes of the constituent distributions in the cell.

Fig. 2.21--Continued

duplications. But for a few media we did know that certain noncell-defining variables had significant effects on joint exposure. From this knowledge we were able to estimate the magnitude of the empirical duplication between selected pairs of these media. For example, saturation effects formed the basis for one such set of estimates. We mentioned in the previous chapter that Comcom data indicate the average Russian-reading Soviet citizen rarely subscribes both to a central and to a Russian language republic paper of the same type. Such publications appear to be functionally equivalent among Russian-reading persons. Based on these data and the large proportion of the Soviet population that reads Russian, we assumed in the simulation that the empirical duplication between central and republic newspapers of the same type was less than would be expected on a chance basis, i.e., less than the product of their population means, by an arbitrary amount. Based on analogous data for Soviet electronic media, we made similar assumptions about the empirical duplication between central and local radio braodcasts and between central and local television broadcasts occurring in the same time slot. Another piece of data on the Soviet mass media system that was discussed in the previous chapter also formed the basis of some duplication estimates. Soviet newspapers below the central administrative level are seldom distributed outside the republic in which they are published, so persons from other republics rarely have access to them. Based on these data we assumed in the simulation that the empirical duplication between any two newspapers published in different republics was virtually zero.

We did not know, in advance, how much of each empirical duplication estimated in the manner described above would be accounted for by cell-defining variables and how much of it would be solely attributable to factors ("language of media consumption," "republic of residence") that had not been included among the dimensions of the simulation population. But the simulation itself helped us to identify and account for those cases in which noncell-defining but exposure-influencing variables had significant effects on duplication. For each pair of media for which we had input an empirical duplication estimate, the simulation measured the difference between this estimate and the expected value of the random-at-the cell-level duplication. Whenever the magnitude of this residual nonrandom duplication was found to be significant, the simulation accounted for it in synthesizing "persons" across the two media by establishing appropriate nonrandom dependences between their within-cell probability distributions. Whenever the magnitude of this residual nonrandom duplication was found to be insignificant, the simulation synthesized "persons" across the two media in the same way that it did across those media for which we had not input empirical duplication estimates, i.e., by linking their within-cell probability distributions randomly. In this way we assigned to each simulated individual an average probability of being exposed to each simulated medium so that the resulting probabilities of joint exposure reflected our empirical duplication estimates for the Soviet mass media system.

IV. Summary of pass I

At this point it would be useful to review the major steps undertaken in pass one of the simulation. We do this by means of the following outline:

A. Distribute demographic and social traits over the simulation population.

1. Use the Mosteller technique to create a sample computer population over which demographic and social traits are distributed in a manner compatible with all reported statistics on those traits.

2. Obtain from this procedure the number of simulated persons to be assigned to each of the cells formed by cross-classifying these traits, i.e., the number of individual exposure probabilities to be assigned to each cell for any simulated medium.

B. Distribute the media's audiences across demographic and social strata of the simulation population.

1. Use the Mosteller technique to create sample computer audiences over which demographic and social traits are distributed in a manner that reflects the composition of the sample computer population and is compatible with all reported audience breakdowns on those traits.

2. Obtain from this procedure the sizes of the simulated media's audiences to be assigned to each cell, i.e., the mean exposure probability in each cell for each simulated medium.

C. Distribute the media's audiences within demographic and social strata of the simulation population.

1. For each simulated medium use a beta function to model an overall distribution of exposure probabilities whose size and shape reflect the sizes of the overall population and the one- and two-issue audiences of the medium within that population; use beta functions also to model three constituent distributions whose sizes and shapes reflect not only the size and shape of the overall distribution but also the sizes of three distinct classes of consumers of the medium and the one- and two-issue audiences within each of these classes.

2. From this procedure obtain for each simulated medium three constituent distributions, each of which consists of various numbers of individual exposure probabilities located at discrete intervals from 0.0 to 1.0.

3. Assign individual exposure probabilities to cells by drawing them randomly without replacement from the three constituent distributions associated with each simulated medium.

4. From this procedure obtain for each simulated medium a distribution of exposure

probabilities within each cell that is compatible with the number of probabilities specified in that cell for any medium and that reproduces, as closely as possible in an expected value sense, the mean exposure probability specified in that cell for that medium.

D. Establish joint distributions of the media's audiences across and within demographic and social strata of the simulation population

1. Use a special-purpose clustering algorithm to group, in overlapping sets of five, all simulated media among which there exist empirical duplications not wholly accounted for by cell-defining variables.

2. Obtain from this procedure fivefold media groups which, by their sequence and the media they contain, specify the order in which the media's audiences should be jointly distributed to account for as much residual nonrandom duplication as possible.

3. For each pair of media in a fivefold group use a linear programming algorithm to compute a mix of joint probability distributions which reproduces their pairwise empirical duplication as closely as possible.

4. From this procedure obtain the sizes of nine joint probability distributions for each pair of media in a fivefold group.

5. For each fivefold group use the Mosteller technique to obtain a mix of joint probability distributions which is consistent with as many of the mixes computed for media pairs in that group as possible and which, therefore, reproduces as many of the pairwise empirical duplications in that group as possible.

6. From this procedure obtain the sizes of 243 joint probability distributions for each fivefold media group.

7. In each cell use the Mosteller technique for each fivefold media group to bias its 243 joint distribution sizes so that they are consistent with the sizes of each medium's constituent distributions in that cell; synthesize "persons" across the media in any fivefold group by establishing, in each cell, the mix of joint distributions obtained by this application of the Mosteller technique; synthesize persons across those media that are not in any fivefold group by randomly linking their within-cell exposure probabilities.

8. From this procedure obtain for each simulated individual an average probability of being exposed to each simulated medium.

A. Pass I and the availability of media data

In reviewing the major steps undertaken in pass I of the simulation we should emphasize two points that were not made explicit in our description of the model. The first point is that the simulation techniques employed in pass I reflect the relative <u>availability</u> of various kinds of data on mass media systems. Pass I estimates each simulated individual's average probability of being exposed to each simulated medium by using whatever data are available on a mass media system. For example, it is difficult to imagine a case in which we would attempt to conduct a communications simulation without having any information on the composition of the target population. In fact, we almost always have census figures which give a fairly accurate picture of how various demographic and social traits are distributed over the population. As a consequence, pass I has been designed so that it requires this kind of data and it will not proceed without it. But the simulation is programmed to work with varying amounts of this kind of information. It can construct a population from its marginal distribution on each individual dimension of interest, from a complete n-dimensional table when there are n dimensions of interest, or from partial tables of intermediate dimensionality. Regardless of whether these tables come from a census or from representative, biased, or sparse samples, the simulation can use them to construct a realistic sample computer population. In addition to population data we would also have to possess at least some information about the composition of the media's audiences in order to carry out a successful communications simulation. In fact, we frequently do have a good deal of firm knowledge about the demographic and social breakdown of the media's audiences. Therefore, pass I has been designed so that it also requires this kind of data. But here again it will accept varying amounts of information. It can distribute the traits of interest over a medium's audience by using simple marginal distributions of the audience on each trait or by using data on the interactions in the audience between various combination of traits. Regardless of whether available audience breakdowns are from representative, biased or sparse samples, the simulation can use them to construct reasonable sample computer audiences.

The simulation techniques for handling data on the structure and cumulation of the media's audiences reflect the typical availability of this kind of information. Frequently, we have some explicit information about the audience overlap between successive issues of a given medium and about the likely mix of different classes of consumers of that medium in the overall population. But even in the absence of explicit information we can almost always estimate these parameters, either from secondary source data or from cross-national comparisons. Accordingly, pass I has been designed so that it requires this kind of data. In the present version of the simulation the researcher must provide estimates of the sizes of the overall one- and two-issue audiences for each medium. He must also provide estimates of the sizes of two consumer classes--those regularly exposed and those rarely exposed to the medium--and the sizes of the one- and two-issue audiences within each of these classes. The simulation then computes these parameters for an intermediate class of consumers by subtraction. This arrangement reflects the fact that cumulation and structural data are more likely to be available for the regular and rare consumers of a medium than for the intermediate class. However, if data on the latter does happen to be available and the researcher has no information on one of the other two classes, he can use this data to derive the missing estimates by subtraction.[1]

As a final example of how the simulation techniques in pass I reflect the availability of different kinds of mass media data we cite the simulation treatment of duplication. Occasionally, we have some data on the audience overlap between average issues of different media. If such data are input to pass I, the simulation computes mixes of joint probability distributions which, when they are established in the sample computer population, reproduce as many of these duplications as possible. The simulation accepts as many of these empirical duplication estimates as the researcher is able to provide, but it can also proceed when no such estimates are available. If no empirical duplication estimate has been input to pass I for a given pair of media, the simulation simply establishes between them a duplication that is random at the cell level, i.e., the duplication accounted for by the

---

[1]Some researchers may have data on or wish to employ only two classes of consumers for each simulated medium. Therefore, the present version of the simulation should be modified so that it can handle the case of two consumer classes for each medium as well as the case of three consumer classes for each medium.

dimensions of the sample computer population alone.

B. Pass I and the reliability of media data

The second point we wish to emphasize in reviewing pass I is that its simulation techniques also reflect the relative reliability of various kinds of data on mass media systems. Pass I estimates each simulated individual's average probability of being exposed to each simulated medium in such a way as to reproduce accurately those data which are generally available in abundant and reliable form and to reproduce somewhat less accurately those data which are generally available in sparser and less reliable form. For example, available census data on a population generally covers more traits of interest and higher order interactions than available audience breakdowns for that population. Therefore, pass I has been designed so that it reproduces, in sample computer audiences, interactions known to exist in the population but for which we lack corresponding audience breakdowns. However, a situation might arise in which available audience breakdowns are more complete and more reliable than available population data. In such cases, the simulation can be used in the opposite fashion, i.e., to reproduce in the sample computer population interactions known to exist in the media's audiences but for which we lack corresponding population breakdowns.

The simulation technique for assigning individual exposure probabilities to cells from constituent distributions also reflects the relative reliability of different kinds of mass media data. Rather than attempting to establish these constituent distributions in each cell, the simulation makes the assignment in such a way as to preserve cell sizes and to reproduce cell means as closely as possible, in an expected value sense. Cell sizes and cell means are preserved because they are derived from census figures and audience surveys respectively, and these two kinds of data are almost always more reliable than data on the structure and cumulation of the media's audiences, from which the constituent distributions are derived.

As a final example of how the simulation techniques in pass I reflect the relative reliability of various kinds of mass media data we again cite the simulation treatment of duplication. Pass I computes mixes of joint probability distributions which, when they are established in the sample computer population, reproduce as many empirical duplications as possible. These mixes are computed in such a way that they reproduce empirical duplications only in an expected value sense, so the constituent distributions which are used to form them enter the computation only in terms of their sizes and means. The latter are derived from data on the size and structure of the media's audiences, data which is generally more reliable than the information we are likely to have about interactions between audiences. That is why the simulation preserves distribution sizes and means in the process of attempting to reproduce empirical duplications. When the simulation attempts to establish in the sample computer population the mixes of joint distributions computed this way, it only links ex-exposure probabilities that have already been assigned to the same cell. Thus, in attempting to reproduce empirical duplications, the simulation also preserves the the distributions of traits over individual audiences that were derived from empirical audience breakdowns, again because the latter are generally more reliable than the available data on interactions between audiences.

C. Inputs required

The following kinds of data are required as inputs for pass I of the simulation:

- --Census or survey data which give breakdowns of the population of interest along the dimensions of interest;
- --Circulation figures, set estimates, ratings, and surveys which indicate the size of each medium's average single-issue audience;
- --Survey data which give breakdowns of the media's average single-issue audiences along the dimensions of interest;
- --Cumulation data which indicate the net size of each medium's average two-issue audience;
- --Structural data which indicate (1) the proportion of the population that are frequent consumers of each medium and the proportion that are essentially nonconsumers of each medium, (2) the amounts of each medium's average single-issue audience in the frequent consumer class and in the nonconsumer class, and (3) the amounts of each medium's average two-issue audience in the frequent consumer and nonconsumer classes;
- --Duplication data which indicate the size of the audience overlap between average issues of various media (optional).

D. Outputs produced

The following output statistics are produced by pass I of the simulation:

- --The number of computer persons assigned to each cell on the basis of the population breakdowns that were read in;
- --For each medium, the number of computer persons assigned to its audience and the mean exposure probability assigned to each cell on the basis of the size and breakdowns of the medium's single-issue audience that were read in;

--For each medium, the number of computer persons assigned to each individual exposure probability and the number of computer persons assigned to the average one- and two-issue audiences of the medium as a result of the shape of the probability distribution estimated for the medium on the basis of the cumulation figures they were read in;

--For each medium, (1) the number of computer persons assigned to each of three probability distributions, (2) the number assigned to each individual exposure probability in each distribution, and (3) the number of computer persons from each distribution assigned to the average one- and two-issue audiences of the medium, as a result of the sizes and shapes of three constituent probability distributions estimated for the medium on the basis of cumulation and structural data that were read in;

--For each medium, a comparison of (1) the mean exposure probability assigned to each cell on the basis of the size and breakdowns of the medium's audience and (2) the mean of the individual exposure probabilities allocated to each cell from the three probability distributions estimated for the medium on the basis of cumulation and structural data;

--A listing of each pair of media for which the empirical duplication estimate that was read in is not wholly accounted for by cell-defining variables;

--A listing of each pair of media between which the audience duplication is other than random at the cell level but which the simulation is unable to account for in the multi-media assignment of within-cell exposure probabilities.

E. Basic assumptions

Some of the more important assumptions which underlie pass I of the Comcom simulation model include the following:

1. If a sample population is distributed over demographic and social traits in such a way that the resulting cell frequencies reproduce reported interactions in the population among those traits, then the more such interactions accounted for in this process, the more likely the resulting cell frequencies are to reproduce all the correct interactions between demographic and social traits in the sample population.

2. If a sample of a medium's audience is distributed over demographic and social traits in such a way that the resulting cell frequencies reproduce reported interactions in the real audience among those traits, then the more such interactions accounted for in this process, the more likely the resulting cell frequencies are to reproduce all the correct interactions between demographic and social traits in the sample audience.

3. Each individual in a population has a (temporarily) fixed personal probability of being exposed to each issue of each medium, and his exposure to any one issue of a given medium is independent of his exposure to any other issue of that medium. In other words, his exposures to various issues of a given medium are independent random events and his exposure to any one of these issues is a Bernoulli process.

4. The distribution of exposure probabilities for any medium can be modelled by three beta functions whose parameter values are estimated from the sizes of that medium's one- and two-issue cumulative audiences, the sizes of any two (out of three) distinct classes of consumers of the medium, and the sizes of the one- and two-issue audiences in each of those classes. The "expected" cumulation curve produced by the three resulting distributions will lie reasonably close to the medium's empirical cumulation curve.

5. If the exposure probabilities for a medium are allocated to cells in such a way that the expected value (over many allocations) of the average of the probabilities allocated to any cell equals the empirical cell mean, then the larger the number of probabilities that need to be allocated to a cell or group of cells, the more likely is any <u>individual</u> allocation to reproduce closely their empirical mean.

6. The distributions of demographic and social traits over the media's audiences account for most of the nonrandom audience duplication among them.

7. If the exposure probabilities for a pair of media are nonrandomly assigned to individuals in such a way that the expected value (over many such assignments) of the proportion of the population assigned to the average audience of both media equals their empirical duplication, then any <u>individual</u> nonrandom assignment produces a <u>population</u> proportion in the audience of both that is closer to their empirical duplication than the proportion that would be produced by a random assignment.

Upon completion of pass I of the simulation each individual has been assigned not only an average probability of being exposed to each medium but also an identification or sequence number and a cell number, i.e., a level on each of the population dimensions. Also, each individual exposure probability carries a tag telling from which constituent distribution it came, so in effect, every simulated individual has also been assigned to a particular class of consumers for each medium. We are now ready to describe what happens when this computer-stored base population is confronted with a simulated schedule of mass media messages.

CHAPTER III

A STATISTICAL MODEL OF EXPOSURE TO MEDIA MESSAGES

CHAPTER III

A STATISTICAL MODEL OF EXPOSURE TO MEDIA MESSAGES

I. Overview

In this chapter we present a detailed description of the second part of the Comcom model, viz. the part that deals with exposure to messages appearing in the media. As in the preceding chapter, our description is not a formal mathematical one but rather is organized around a number of concrete examples. At the end of the chapter we catalogue, in turn, the kinds of empirical data required as inputs for this second part of the model, the output statistics that it produces, and the basic assumptions which underlie it. By carefully examining these features a potential user of the Comcom simulation should be able to determine whether the model of exposure to media messages on which it is based is applicable to his own research problem.

We now proceed to describe the major data-handling techniques and computer procedures employed in the second pass of the simulation.

II. Pass II: Simulating exposure to media messages

Pass I uses aggregate data on a population's demographic, social and media-consumption traits to assign each member of a sample computer population stable and realistic predispositions of exposing himself to average issues of various media. The output of pass I is therefore a static representation of a real population, in the form of a statistically-described base population.

The first part of pass II adds another layer of statistical description to this base population. Using aggregate data on the message-response characteristics of the media's audience members, pass II assigns each person in the base population stable and realistic predispositions of exposing himself to various types of messages that appear within the media. This assignment is made in such a way as to reproduce or to approximate the independent effects of a message's theme and format on the response to it by a medium's audience members. Each simulated person's message-response characteristics are summarized by his average probability of being exposed to each type of message in each simulated medium, given that he is exposed to the medium itself.

The second part of pass II makes the simulation dynamic. First, it reads in content analysis data which summarize a pattern of message appearances in the media over time. Hereafter, we shall refer to this stream of media messages as a "scenario." Then, using data which describe likely departures from normal habits of media use and message response during the period covered by the scenario, pass II assigns each member of the sample computer population an appropriate pattern of deviation from his usual exposure predispositions during this period. The assignment is made in such a way as to reproduce or to approximate any changes in habits of media use and message response that are a function of an individual's exposure history or of the stage of the scenario. Departures from normal media-use and message-response behavior are summarized for each simulated individual in the form of a "change factor," i.e., a factor by which his normal exposure probability for each message in the scenario is to be multiplicatively transformed.

In the final part of pass II the base population is confronted with a scenario. Cycling through time periods, the simulation pairs each media message in the scenario with each person in the sample computer population, looks up or calculates all the factors that affect the exposure probability for the pair, and calculates the probability as a multiplicative function of these factors. They include (1) the individual's media habits, as summarized by his pass I probability of exposure to the medium, (2) the individual's response characteristics, as summarized by his pass II conditional probability of exposure to the message's theme, (3) the message's format, as summarized by its format factor, and (4) the amount, if any, by which the individual is deviating from his normal media-consumption and message-response habits, as summarized by his pass II change factor. At the end of each time period the simulation uses the exposure probabilities obtained for all message-individual pairs through that time period to compute the expected values of current and cumulative exposure statistics. These statistics are printed out for purposes of analysis. At the end of the simulation they form hypothetical time series data describing the likely exposure of the sample computer population to media messages in the scenario.

A. Distributing message-response characteristics over sample computer audiences

1. Approaches that were rejected

In pass I we created a statistical description of a population assigning each member stable and realistic predispositions of exposing himself to average issue of various media. The object of the first part of pass II is to assign each member of this sample computer population stable and realistic predispositions of exposing himself to various types of messages in the media. In constructing this part of the model we have considered and rejected two possible approaches. The first would have been to replicate the statistical procedures employed in pass I, treating messages the way we treated media. Using this approach we would attempt to estimate each simulated individual's probability of being exposed to each simulated message in the following manner: For any message appearing in any given medium we would assemble data on the size and composition of that segment of the medium's audience normally attracted to messages with the theme and format of that message. Using the data on its size and composition together with the Mosteller technique, we would distribute the message's audience over population cells, thereby obtaining a mean exposure probability for the message in each cell. Then we would assemble data on the structure and cumulation of the audience for media messages of this type (i.e., messages appearing in the given medium with the theme and format of the given message) and use it to distribute the message's audience over consumer classes and exposure frequencies appropriately, both in the overall population and within each cell. Finally, we would assemble any data there was on residual interactions between the audience for messages of this type and the audiences for other types of messages, and use it to establish appropriate joint distributions of various types of message's audiences over multi-message consumer classes, both in the overall population and within each cell.

Aside from the obvious empirical problems with this approach, there are two other factors which rule it out. For any given message we would obtain up to 500 cell means and as many as 3,000 exposure probabilities. A data structure of this kind for each of up to 64 media is manageable, but when it is repeated for each of the large number of messages that can appear in a scenario, it clearly exceeds the limits of computer storage capacity.[1] Moreover, it would be far more difficult to derive cell means and exposure probabilities for a media message from aggregate data on the audience for that type of message than it was to derive these parameters for a medium from aggregate data on the medium's audience. Each cell mean or exposure probability for an individual-message pair would be a very complicated function of the theme of the message, the medium and format in which it appears, the stage of the scenario at which it appears, and the attributes of the individual--both cell-defining and noncell-defining. So

---

[1]There can be up to 1,800 messages for any theme in the scenario.

even if there were sufficient computer storage capacity for this approach, the magnitude of the statistical problem it would pose and the cost of the computer time it would require are both prohibitive. For these reasons it was clear that, in order to arrive at a simulable model of exposure, we had to develop a simpler method of computing message exposure probabilities, one which would undoubtedly ignore some of the possible interactions within and between the audiences of various types of media messages.

The second approach which we considered and rejected lay at an opposite extreme from the first, because it was the simplest possible approach. We would simply have assumed that each simulated individual's pass I probability of exposure to any given medium was also his pass II conditional probability of exposure to any message appearing in that medium. But this assumption is demonstrably false. It implies that any person in the audience of a given medium notes any message appearing in an average issue of that medium with a probability of 1.0. In reality we know that this conditional exposure probability generally is not 1.0 and that often it is not even a constant. As a result, we have rejected this approach as well.

The pass I description of a population in terms of its media-consumption habits is only a pre-condition for simulating exposure when that population is confronted with a scenario of media messages. Before we can simulate exposure to these messages we must also assign message-response characteristics to each member of the base population. In other words, we must estimate each simulated individual's average probability of being exposed to each different type of message in the scenario, given that he is exposed to the medium in which that message appears. In every case this conditional exposure probability will be a function of the message's theme and its format. Accordingly, the first part of pass II has been designed to estimate each simulated individual's conditional probability of exposure to each type of media message in a scenario, in a way that reflects the independent influences of these two factors. We now proceed to describe the model for this approach which, in terms of its complexity, lies somewhere between the two approaches described above.

2. Audience response as a function of the message's theme

Generally, we have only aggregate data describing how various types of individuals respond to specific classes of content or themes appearing in the mass media. A simple example will serve to illustrate the kind of information we normally have and how we use it in the simulation. Frequently, our information enables us to make statements like the following: "On the average, 25 per cent of all Soviet newspaper readers are exposed to an article about Communist Party affairs."[1] Although we can seldom estimate the actual likelihood of a given type of newspaper reader being exposed to an article on Party affairs, often we can make the following kind of statement about the relative likelihood of different types of readers being exposed: "Among Soviet newspaper readers, a member of the Communist Party is two and one-half times as likely as a nonParty member to read an article about Party affairs." In designing pass II we have made several assumptions about these two kinds of theme-response data. We have assumed that they represent the average readership response to a large number of articles on Party affairs appearing in a large number of Soviet newspapers in every possible format, that the set of formats in which articles on Party affairs can appear is substantially the same in each newspaper, and that the articles sampled

---

[1]We assume that this statistic represents an average over all types of newspaper readers and all types of articles on Party affairs.

from each paper in order to obtain these data were representative with regard to their distribution over the various formats. Under these assumptions, the two pieces of theme-response data represent something intrinsic to the theme "Party affairs," viz., its effect on the response of newspaper readers independent of the type of article or format in which it is conveyed. Stated another way, the 25 per cent figure and the 2.5 to 1 ratio represent the effect of the theme "Party affairs" on the response of newspaper readers when that theme is conveyed in a newspaper article whose format has "average attractiveness." Before proceeding further, however, it is important that we define this concept of a theme's average attractiveness more clearly.

a) Definition of a theme's average attractiveness

Suppose there are only three formats in which articles on Party affairs ever appear in Soviet newspapers --short news items (50%), long articles (40%), and editorials (10%). Suppose also that, on the average, 20 per cent of all Soviet newspaper readers are exposed to any short news item about Party affairs, 25 per cent are exposed to any long article, and 50 per cent are exposed to any editorial. Then, in terms of these format-response data,

Figure 3.1 defines the concept of a theme's average attractiveness.

In this hypothetical example long articles on Party affairs have average attractiveness because the average percentage of Soviet newspaper readers exposed to any one of them is the same as the average percentage exposed to all types of articles on Party affairs. The example shows one of the possible ways that the relative attractiveness of a given type of article on Party affairs can be numerically expressed, i.e., as the quotient of two aggregate statistics: the average percentage of Soviet newspaper readers exposed to that type of article and the average percentage exposed to all types of articles on Party affairs. Hereafter, we shall refer to this index as a "format factor." It can be applied not only to newspaper articles but to the various possible formats in any kind of medium.[1]

b) The case of one cell-defining attribute

We can now proceed with our description of how the

[1]For print media it might reflect column inches or type of article (editorial, short news item, etc.). For electronic media it might reflect broadcast hours or type of program (newscast, commentary, etc.). However, the format factor may also reflect the time and/or place limits of the availability of an issue.

Format-response data for the theme "Party affairs"

Format of Article	Short News Item	Long Article	Editorial
% of All Articles on Party Affairs	50	40	10
Average % of Newspaper Readers Exposed	20	25	50
Weighted %	10	10	5
Format Factor	20/25=.8	25/25=1.0	50/25=2.0
Attractiveness	Less than Average	Average	Greater than Average

Fig. 3.1--A hypothetical example illustrating the concept of a theme's average attractiveness.

simulation uses aggregate theme-response data to account for the responses of various types of audience members to media messages conveying a given theme. Recall that in our example we have information specifying that (1) on the average, 25 per cent of all Soviet newspaper readers are exposed to the theme "Party affairs" when it appears in a newspaper article having average attractiveness and (2) among Soviet newspaper readers, a member of the Communist party is two and one-half times as likely as a nonParty member to read an article about Party affairs. From format-response data (Figure 3.1) we know that this theme's most attractive newspaper format is an editorial, its average format is a long news article, and its least attractive format is a short news item. (The present version of the simulation is designed in such a way that it would apply these aggregate theme- and format-response data uniformly to individual Soviet newspapers and newspaper articles, as follows: it would assign 50 per cent of the average readership of any newspaper to the readership of any editorial on Party affairs in that paper; the percentage of Party members in any newspaper's average readership that it would assign to the readership of any type of article on Party affairs in that paper would be just 2.5 times the percentage of nonParty members in that paper's readership that it would assign to the article's readership; it would assign format factors of 2.0, 1.0, and 0.8, respectively, to all editorials, long news articles, and short news items on Party affairs, regardless of the particular newspaper in which these articles appeared or the particular type of person who was being confronted with these articles.)

Suppose now that pass I has assigned 120 computer persons to the average single-issue readership of _Pravda_ and that it has distributed this readership across cells in such a way that one out of every six readers of _Pravda_ is a member of the Communist Party. In the simulation we wish to account for the effect of the theme "Party affairs" on the responses of _Pravda_ readers to articles conveying that theme independent of type of article in which it is conveyed, i.e., we wish to account for whatever effect is implied in the aggregate theme-response data alone. We do this by estimating each different type of _Pravda_ reader's average probability of being exposed to the theme "Party affairs" in its most attractive newspaper format, viz., an editorial on the subject. If we assume, for the moment, that "political involvement" is the only cell-defining attribute in the simulation, then Figure 3.2 shows how the simulation would make this estimate for Party members and for nonParty members.

$$20p_1 + 100p_2 = 50\% \times (120)$$

and $\quad p_1/p_2 = 2.5$

so $\quad p_1 = 1.0$ and $p_2 = 0.4$

where $\quad p_1$ = the mean conditional theme-exposure probability for Party members;

p_2 = the mean conditional theme-exposure probability for nonParty members.

Fig. 3.2--Computing, for the members of a medium's audience, average probabilities of exposure to a theme in its most attractive format.

The first equation expresses the fact that the product of the number of Party members in the single-issue readership of Pravda and their mean probability of reading an editorial on Party affairs, when added to the corresponding product for nonParty members in the single-issue readership, must sum to the average percentage of a newspaper's readership exposed to editorials on Party affairs. The second equation simply expresses the relative likelihood of Party and nonParty members being exposed to an article on Party affairs. By solving the two equations in two unknowns we find that Party members in the single-issue readership of Pravda are exposed to virtually every editorial on Party affairs appearing in that paper, and that nonParty members are exposed to only about 40 per cent of these editorials. We are also able to determine that the average audience of a Pravda editorial on Party affairs consists of 1.0 x 20 = 20 Party members and 0.4 x 100 = 40 nonParty members.[1]

---

[1]The simulation computes the percentage of a medium's audience exposed to any theme in its most attractive format by taking the product of (1) the largest format factor and (2) the average percentage of a medium's audience exposed to that theme, both of which are specified by the researcher. If this maximum possible theme audience is not appropriately related to the ratios of average theme-exposure probabilities on adjacent dimension levels, also specified by the researcher, then, by solving equations such as those in Figure 3.2, the simulation can obtain average theme-exposure probabilities greater than 1.0 for some audience types. For example, if the researcher had specified that, on the average, 75 per cent of a Soviet newspaper's readers were exposed to an editorial on Party affairs (rather than 50 per cent) in the case we have been discussing, then, by solving the equations in Figure 3.2, the simulation would have obtained 1.5 as the average probability of exposure to editorials on Party affairs among Pravda readers who are Party members. The present version of the simulation is programmed so that, whenever a situation of this kind arises, it reduces each conditional theme-exposure probability which has been computed as greater than 1.0 to a fraction slightly less than 1.0, and it informs the researcher of the net reduction in the size of the maximum possible theme audience resulting from this procedure. If the researcher finds this new maximum theme audience unrealistically small for the format in question, then he has two alternatives: In the example discussed above, he could reduce the ratio of average theme-exposure probabilities that he initially specified on the "political involvement" dimension (to some value less than or equal to 10/7 if he desires no reduction at all in the maximum theme audience), or he could maintain the initial set of ratios and restrict all newspaper articles in his scenario to short news items and long articles.

c) The case of two cell-defining attributes

Assume now that pass I has distributed sample computer audiences across cells defined by two variables instead of one, say "political involvement" and "sex." Generally, we will have data on, or be able to estimate, the ratio of conditional theme-exposure probabilities for men and women as well as for Party members and nonParty members. For example, suppose that among the single-issue readership of Pravda, men are twice as likely as women to read an article on Party affairs, and that pass I has distributed the single-issue readership of Pravda across cells in such a way that it is equally divided between men and women. This time, before we can compute the average conditional exposure probability in each cell for Pravda editorials on Party affairs, we must first compute it separately for men, women, Party members and nonParty members. Let us assume that Party members and nonParty members have the average conditional theme-exposure probabilities that were computed above. Then, solving two equations in two unknowns the same way that we did in Figure 3.2, we obtain average conditional theme-exposure probabilities of .667 and .333 for men and women respectively. The next step is to compute the readership marginals on each dimension for <u>Pravda</u> editorials on Party affairs. Multiplying each "sex" marginal in the readership of <u>Pravda</u> by its corresponding average theme-exposure probability, we obtain marginals of 60 x 0.667 = 40 men and 60 x 0.33 = 20 women for the readership of any <u>Pravda</u> editorial on Party affairs. We have already computed the corresponding marginals for Party members and nonParty members. The problem now is to distribute the readership of this theme in its most attractive format across the four cells (formed by cross-classifying the two dimensions) in a way that is compatible with the marginals computed on each dimension. In the present version of the simulation we do this by assuming no interactions in the theme's readership between cell-defining attributes, i.e., we simply assign the cross-product value to each cell, as illustrated in Figure 3.3.

It is now an easy matter to compute the average conditional exposure probability in any cell for a <u>Pravda</u> editorial in Party affairs. We simply divide the theme's readership in that cell by the average single-issue <u>Pravda</u> readership assigned to that cell in pass I.[1]

---

[1]Here again, it is possible to obtain average theme-exposure probabilities greater than 1.0 for some audience types, but for a reason different from that discussed in n. 1 on p. 269. In the present version of the

	Men	Women	
Party members	13	7	20
NonParty members	27	13	40
	40	20	60

$$\frac{40}{60} \times \frac{20}{60} \times 60 = 13$$

$$\frac{20}{60} \times \frac{20}{60} \times 60 = 7$$

$$\frac{40}{60} \times \frac{40}{60} \times 60 = 27$$

$$\frac{20}{60} \times \frac{20}{60} \times 60 = 13$$

Fig. 3.3--Distributing the audience of a theme in its most attractive format across population cells in such a way as to preserve the theme's known audience marginals on each population dimension.

d) The general case

By extending the example discussed above we can convey a more general picture of how the simulation accounts for the relationship between the theme of any media message and the response which that message evokes from various types of persons in the medium's audience. Assume that pass I of the simulation has distributed sample Soviet newspaper readerships across several cell-defining attributes, and that, for each theme in a scenario, pass II has obtained from the researcher (1) the ratios of average theme-exposure probabilities for Soviet newspaper readers on adjacent levels of the cell-defining dimensions and (2) the average percentage of Soviet newspaper readers exposed to the theme in its most attractive newspaper

---

simulation, for any medium, we distribute the maximum possible theme audience across cells by taking cross-product values implied by the theme's audience marginals. Because we then obtain the mean conditional exposure probability in any cell by dividing the theme's audience in that cell by the medium's audience in that cell, it is entirely possible that this method of distributing theme audiences can produce average theme-exposure probabilities greater than 1.0. (Whenever this happens, the simulation follows the same procedure described in n. 1 on p. 269.) An alternative method of distributing theme audiences across cells, and one which would decrease the likelihood of obtaining average theme-exposure probabilities greater than 1.0, would be to initialize the cells with a medium's audience marginals and to use the Mosteller technique to bias them until they exactly reproduce the theme's audience marginals for that medium.

format. For any theme in the scenario and for each Soviet newspaper in which that theme appears, pass II of the simulation would use these aggregate theme-response data and the paper's pass I readership marginals to compute, for the paper's readership <u>on each dimension level</u>, an average probability of exposure to that theme in its most attractive newspaper format. (For dimensions having more than two levels, more than two conditional exposure probabilities would be computed, but the procedure remains straightforward. An additional ratio is specified for each additional level, so for any n-level dimension there are always n equations in n unknowns of the kind illustrated in Figure 3.2 above.) Then, the simulation would multiply the average theme-exposure probability computed for the paper's readership on each dimension level by the paper's readership marginal on that level to obtain the theme's readership marginal on that level, and, as illustrated in Figure 3.3 above, it would distribute the readership of the theme in its most attractive format across the various population cells by taking the cross-product values of its readership marginals. Finally, the simulation would compute an average probability of exposure to the theme in its most attractive format, for the paper's readership in each cell, by dividing the theme's readership in that cell by the paper's readership in that cell. Because the newspaper readership marginals established on any cell-defining dimension by pass I will generally vary from one paper to another, the average probabilities of theme exposure calculated for newspaper readers on each dimension level and in each cell also will vary from one paper to another.

e) User options with regard to theme-response data

Since there are a large number of options available to the researcher in pass II of the simulation, perhaps it would be useful to enumerate those which have been developed so far. For any given theme in a scenario, the researcher has the option of aggregating individual media into as many as six different types and of specifying, for the audience of each type of medium, a different set of ratios of theme-exposure probabilities on adjacent levels of various cell-defining dimensions. The media types specified for any theme need not contain the same individual media as the media types specified for any other theme. Thus, for one theme a researcher can specify a set of ratios for print media and a different set of ratios for electronic media, while for another theme he can specify different sets of ratios for newspapers, radio, and television. But even if the researcher uses the same media types for each theme in a scenario, the ratios he specifies for one theme on a given cell-defining dimension, for a particular type of medium, need not be the same as the ratios he specifies for any other theme on that dimension, for the same type of medium. For example, a researcher can specify that male newspaper readers are twice as likely as female newspaper readers to read an article on Party affairs, and, at the same time, specify that female newspaper readers are twice as likely as male newspaper readers to read a human interest story. Finally, for any given theme and any particular type of medium, ratios need not be specified on all the cell-defining dimensions. If they are specified on only a subset of these dimensions, then for any medium the simulation will compute average probabilities of theme exposure for member's of the medium's audience in cell-aggregates defined by this subset of dimensions rather than for members of the medium's audience in individual cells. The average theme-exposure probability computed for the audience members in any cell-aggregate will be the probability that is used for the audience members in each individual cell contained in that aggregate.

3. Audience response as a function of the message's format

For any medium in which a given theme appears we have described how pass II of the simulation uses aggregate theme-response data and that medium's pass I audience marginals to compute, for the medium's audience members in each cell, an average probability of exposure to the theme in its most attractive format. We now proceed to describe how pass II accounts for the responses of a medium's audience members to messages in the medium conveying a given theme in a variety of formats.

3) Normalizing format factors linearly

Unlike pass I the second pass of the simulation does not use the mean probability of theme exposure computed for a cell to distribute individual probabilities of theme exposure within that cell. To do this it would require data on the structure and cumulation of the media's audiences for given themes, and, as we mentioned above, this kind of data is not normally available. As a result, when the simulation finally confronts the base population with a scenario, i.e., when it cycles through time periods for every theme in a scenario, pairing each message in a medium with each individual member of that medium's audience, it has the following two numbers to work with in computing the conditional exposure probability for any message-individual pair: the media message's format factor and, for the individual audience member's cell, the average probability of exposure to the theme in its most attractive format. However, the format factors assigned by a researcher to the media messages conveying a given theme generally will not be normalized with respect to the theme's most attractive format, but rather, with respect to its average format. (We assume that a researcher generally will adopt the format index described in Figure 3.1 above, assigning format factors greater than 1.0 to media messages conveying a given theme in formats having greater than average attractiveness and assigning format factors less than 1.0 to media messages conveying a given theme in formats having less than average attractiveness.) As a result, the product of a media message's format factor and, for an individual audience member's cell, the average probability of exposure to that theme in its most attractive format will not produce the correct conditional exposure probability for a message-individual pair. This can be demonstrated in terms of our original example.

Assume that the distribution of Pravda's average single-issue readership by "political involvement" and "sex" is that shown in Figure 3.4. From Figure 3.3 we produce the readership distribution computed for a _Pravda_ editorial on Party affairs, and from Figure 3.1 we reproduce the average percentages of Soviet newspaper readers that were assumed to be exposed to short news items, long articles, and editorials on Party affairs and the format factors that were assumed for these three types of newspaper articles. Confronting the hypothetical _Pravda_ readers with each type of article in turn, we compute the conditional exposure probability for each article-reader pair as the product of the article's format factor and, for the _Pravda_ reader's cell, the average probability of exposure to the most attractive type of newspaper article on Party affairs, in this case an editorial. It can be seen that using this method the simulation would expose 40, 50, and 100 per cent of the hypothetical _Pravda_ readers to a short news item, a long article, and an editorial on Party affairs, respectively. These excessively high theme audiences (_twice_ the corresponding empirical percentages) are due to the fact that the average theme-exposure probabilities computed by the simulation for the four types of _Pravda_ readers (13/13, 7/7, 27/47, 13/53) are normalized with respect to a _Pravda_ editorial on Party affairs, while the format factors assigned by the researcher to the three articles (0.8, 1.0, 2.0) are normalized with

	Men	Women	
Party Members	13	7	20
Non Party Members	47	53	100
	60	60	120

Hypothetical distribution of *Pravda*'s readership by "political involvement" and "sex" (obtained from pass I)

	Men	Women	
Party Members	13	7	20
Non Party Members	27	13	40
	40	20	60

Readership of a *Pravda* editorial on Party affairs, distributed by "political involvement" and "sex" (computed from theme-response data)

Type of Article	Short News Item	Long Article	Editorial
Average % of Newspaper Readers Exposed	20	25	50
Format Factor	0.8	1.0	2.0

Format-response data normalized with respect to a long article on Party affairs

<u>Short News Item</u> $\left[\frac{13}{120} \times \left(\frac{13}{13} \times 0.8\right) + \frac{7}{120} \times \left(\frac{7}{7} \times 0.8\right) + \frac{47}{120} \times \left(\frac{27}{47} \times 0.8\right) + \frac{53}{120} \times \left(\frac{13}{53} \times 0.8\right)\right] \times 100 = \underline{40\%}$

<u>Long Article</u> $\left[\frac{13}{120} \times \left(\frac{13}{13} \times 1.0\right) + \frac{7}{120} \times \left(\frac{7}{7} \times 1.0\right) + \frac{47}{120} \times \left(\frac{27}{47} \times 1.0\right) + \frac{53}{120} \times \left(\frac{13}{53} \times 1.0\right)\right] \times 100 = \underline{50\%}$

<u>Editorial</u> $\left[\frac{13}{120} \times \left(\frac{13}{13} \times 2.0\right) + \frac{7}{120} \times \left(\frac{7}{7} \times 2.0\right) + \frac{47}{120} \times \left(\frac{27}{47} \times 2.0\right) + \frac{53}{120} \times \left(\frac{13}{53} \times 2.0\right)\right] \times 100 = \underline{100\%}$

Fig. 3.4--Excessively high theme audiences obtained by multiplying format factors normalized with respect to a theme's average attractiveness by average theme-exposure probabilities normalized with respect to a theme's maximum attractiveness.

respect to a somewhat less attractive type of Pravda article on Party affairs, viz., a long article on that subject.

Because the cell means calculated by the simulation from theme-response data are normalized with respect to a theme's most attractive format, the format factors assigned by a researcher to the media messages conveying that theme have to be adjusted by the simulation so that they too are normalized with respect to the theme's most attractive format. The procedure we have developed for doing this is illustrated by the hypothetical example in Figure 3.5. For any theme in a given scenario we obtain each new format factor by multiplying the corresponding old format factor by the following quotient: the average percentage of a medium's audience exposed to the theme (20%) divided by the average percentage of a medium's audience exposed to the theme in its most attractive format (90%). We choose this multiplier because, as the inverse of the format factor which the researcher will have assigned to any message conveying the theme in its most attractive format, it insures that the new format factors will be normalized with respect to this format. We choose a linear function for the normalization in order to maintain the same ratios among the new format factors that existed among the old.

Average percentage of a medium's audience exposed to the theme = 20%

Percentage of a medium's audience exposed to the theme in its most attractive format = 90%

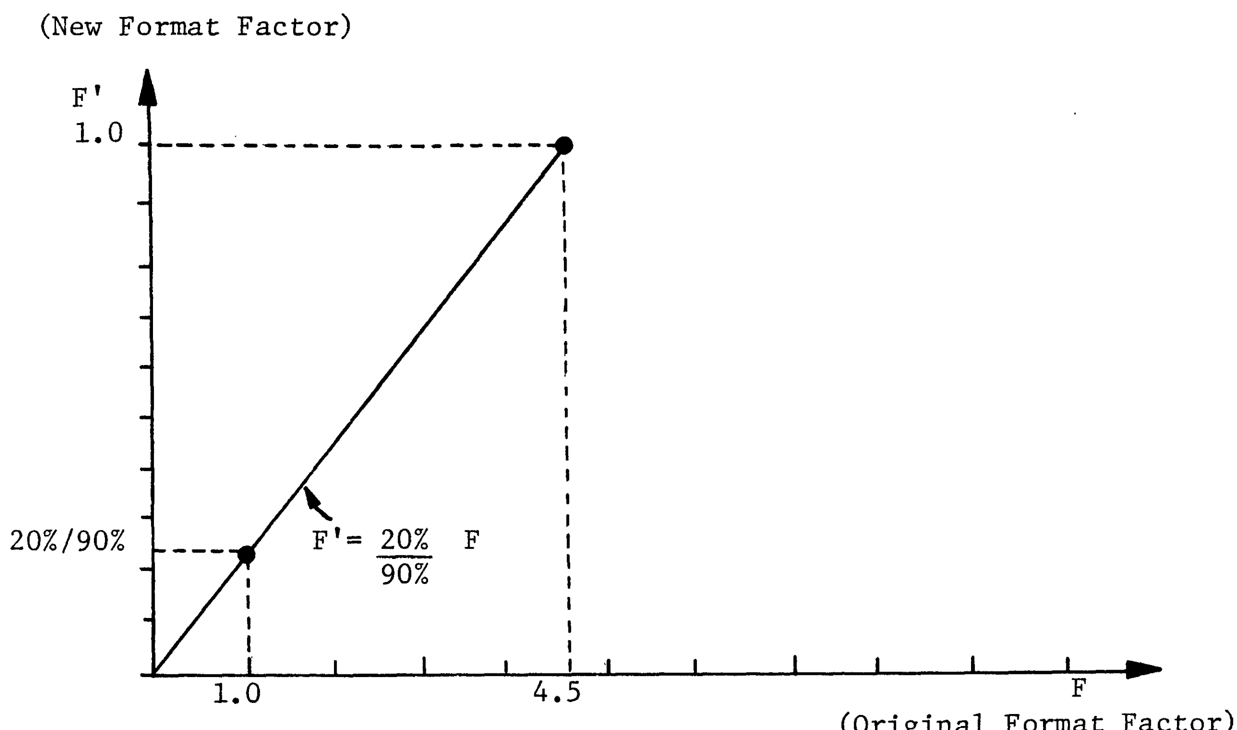
Original format factor: 0.5, 1.0, 2.0, 4.5

Implied percentage of a medium's audience exposed to the theme = 10%, 20%, 40%, 90%

Data specified for a given theme by a hypothetical researcher

Problem: The original format factors are normalized with respect to the theme's average attractiveness. How can we adjust them so that they are normalized with respect to the theme's most attractive format, and, at the same time, maintain the ratios among the new format factors that existed among the old?

Solution: Let the new format factors equal (20%/90%) of the original ones.



Original format factors: 0.5, 1.0, 2.0, 4.5
New format factors: 0.111, 0.222, 0.444, 1.000

Fig. 3.5—Normalizing format factors linearly.

Suppose that in our original example we carry out the normalization procedure described above, multiplying the original format factors of 0.8, 1.0, and 2.0 by (25%/50%) to obtain new format factors of 0.4, 0.5, and 1.0 respectively. Suppose, then, that we again confront the hypothetical *Pravda* readers with each type of article in turn (Fig. 3.6), this time computing the conditional exposure probability for each article-reader pair as the product of the article's *adjusted* format factor and, for the *Pravda* reader's cell, the average probability of exposure to an editorial on Party affairs. The adjusted format factors have been normalized with respect to an editorial on Party affairs, so each is half of its original value. As a result, each weighted sum of cell means is half of its original value, and we obtain correct *Pravda* readerships of 20, 25, and 50 per cent for a short news item, a long article, and an editorial respectively.

b) Normalizing format factors quadratically to account for ceiling effects

There is an important case in which the simulation follows a procedure slightly different from the one described above. Suppose that in our original example the format factor which the researcher had assigned to

	Men	Women	
Party members	13	7	20
Non Party members	47	53	100
	60	60	120

Hypothetical distribution of *Pravda*'s readership by "political involvement" and "sex" (obtained from pass I)

	Men	Women	
Party members	13	7	20
Non Party members	27	13	40
	40	20	60

Readership of a *Pravda* editorial on Party affairs, distributed by "political involvement" and "sex" (computed from theme-response data)

Type of Article	Short News Item	Long Article	Editorial
Average % of Newspaper Readers Exposed	20	25	50
Original Format Factor	0.8	1.0	2.0
Adjusted Format Factor	0.4	0.5	1.0

Format-response data before and after normalization with respect to an editorial on Party affairs

Short News Item $$\left[\frac{13}{120} \times \left(\frac{13}{13} \times 0.4\right) + \frac{7}{120} \times \left(\frac{7}{7} \times 0.4\right) + \frac{47}{120} \times \left(\frac{27}{47} \times 0.4\right) + \frac{53}{120} \times \left(\frac{13}{53} \times 0.4\right)\right] \times 100 = \underline{20\%}$$

Long Article $$\left[\frac{13}{120} \times \left(\frac{13}{13} \times 0.5\right) + \frac{7}{120} \times \left(\frac{7}{7} \times 0.5\right) + \frac{47}{120} \times \left(\frac{27}{47} \times 0.5\right) + \frac{53}{120} \times \left(\frac{13}{53} \times 0.5\right)\right] \times 100 = \underline{25\%}$$

Editorial $$\left[\frac{13}{120} \times \left(\frac{13}{13} \times 1.0\right) + \frac{7}{120} \times \left(\frac{7}{7} \times 1.0\right) + \frac{47}{120} \times \left(\frac{27}{47} \times 1.0\right) + \frac{53}{120} \times \left(\frac{13}{53} \times 1.0\right)\right] \times 100 = \underline{50\%}$$

Fig. 3.6--Correct theme audiences obtained by multiplying format factors by average theme-exposure probabilities when both are normalized with respect to a theme's maximum attractiveness.

editorials on Party affairs was 5.0 instead of 2.0. Combined with the researcher's theme-response data, this would have implied that 5.0 x 25% = 125% of _Pravda's_ readers were exposed to an editorial on Party affairs.[1] If a situation of this kind had arisen in our example, the present version of the simulation has been designed so that it would have asked the researcher what percentage of a newspaper's readership he _really_ wished to be exposed to an editorial on Party affairs, to which the researcher might have responded: "50 per cent." The simulation would then have used this figure (instead of 125 per cent) to compute, for the _Pravda_ readers in each cell, an average probability of exposure to an editorial on Party affairs. Of course, these cell means would still have been computed by the method illustrated in Figures 3.2 and 3.3 above. However, the simulation would not have been able to use the simple linear adjustment procedure described above to normalize the researcher's format factors with respect to an editorial on Party affairs. Multiplying each of these format factors by (25%/50%), it would

---

[1]An apparent contradiction of this kind can arise when a researcher has obtained his format-response data from a different source than his theme-response data. It generally signifies that a "ceiling effect" is associated with larger format factors. This term is frequently used to refer to a well-known phenomenon which can be described as follows: The greater an individual's likelihood of exposure, the smaller the percentage increase in that likelihood caused by an exposure-increasing factor. An analogous floor effect is sometimes associated with exposure-decreasing factors.

have obtained new format factors of 0.4, 0.5, and 2.5 respectively. Not only would the adjusted format factor for editorials on Party affairs still have exceeded 1.0, but, because of the relationship between the researcher's theme- and format-response data, the simple linear adjustment procedure also would have failed to normalize any format factor greater than 2.0 which the researcher might have specified. Therefore, in order to normalize a researcher's format factors with respect to a theme's most attractive format when some of these format factors are excessively large, we have developed the special adjustment procedure illustrated in Figure 3.7.

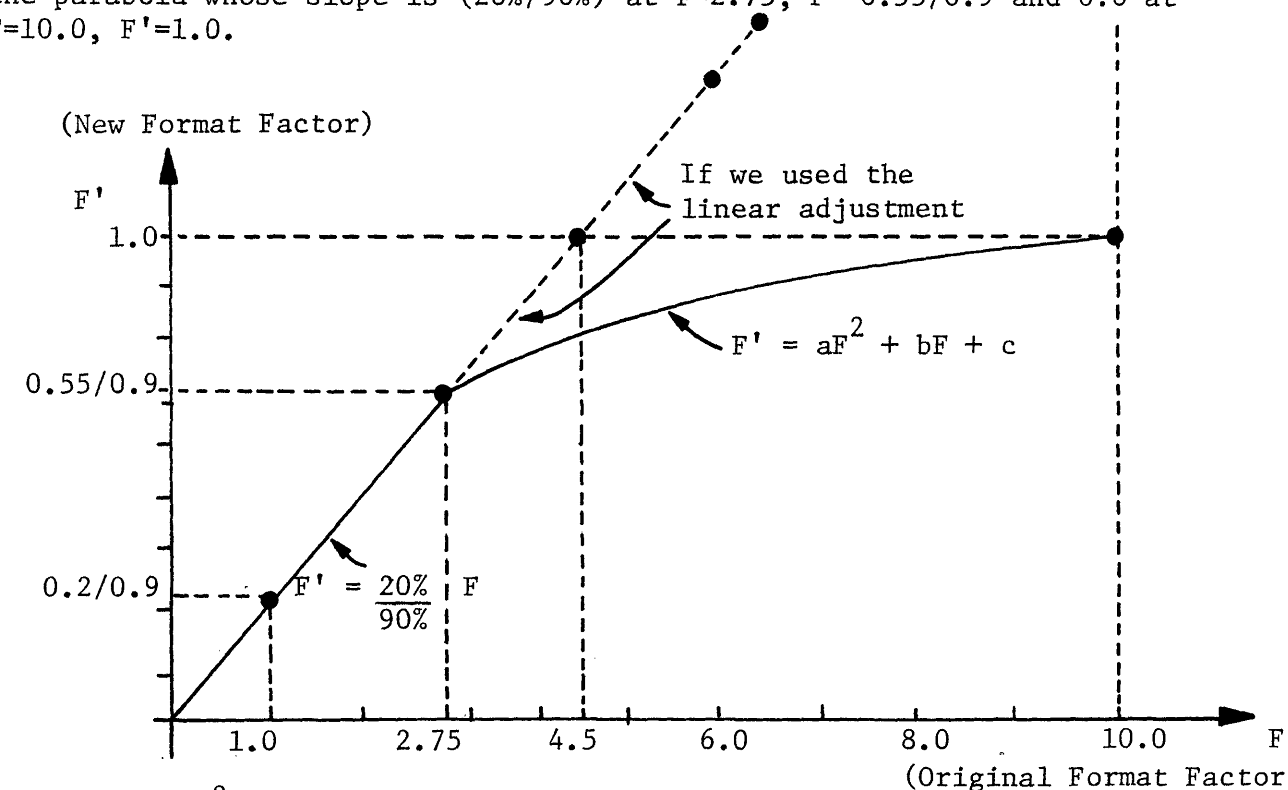
Among the format factors assigned by a hypothetical researcher to the media messages conveying a given theme are three (6.0, 8.0, or 10.0), any one of which, when multiplied by the average percentage of a medium's audience specified by the researcher as exposed to the theme (20%), produces a theme audience (1.2, 1.6, or 2.0 times) greater than the medium's audience. When the hypothetical researcher is confronted with this apparent contradiction, he specifies that 90 per cent of a medium's audience is exposed to the theme in its most attractive format. Under circumstances such as these the simulation uses the linear function described above to normalize any format factor whose original value is below a certain cutoff point, and it uses a quadratic function to normalize any format factor whose original value is above

Average percentage of medium's audience exposed to the theme = 20%
Percentage of medium's audience exposed to the theme in its most attractive format = 90%
Original format factor: 0.5, 1.0, 2.0, 4.0, 6.0, 8.0, 10.0
Implied percentages of a medium's audience exposed to the theme: 10%, 20%, 40%, 80%, 120%, 160%, 200

} Data specified for a given theme by a hypothetical researcher

<u>Problem</u>: The original format factors are normalized with respect to the theme's average attractiveness, and three of the original format factors (6.0, 8.0, and 10.0) produce theme audiences greater than 90% of a medium's audience. How can we adjust the original format factors so that the three largest are normalized in the form of a ceiling effect with respect to the theme's most attractive format and, at the same time, maintain among the other new format factors the ratios that existed among the old format factors?

<u>Solution</u>: For values of the original format factors less than the midpoint of 1.0 and 4.5, i.e., less than 2.75, let the new format factors equal (20%/90%) of the original ones; for values of the original format factors greater than 2.75, let the new format factors be a quadratic function of the original ones, viz., that function described by the parabola whose slope is (20%/90%) at F=2.75, F'=0.55/0.9 and 0.0 at F=10.0, F'=1.0.



$$1.0 = a(10.0)^2 + b(10.0) + c \qquad\qquad a = -0.0124$$
$$0.0 = 2a(10.0) + b \quad \Longrightarrow \quad b = 0.2480$$
$$(20\%/90\%) = 2a(2.75) + b \qquad\qquad c = -0.2400$$

Original format factors: 0.5, 1.0, 2.0, 4.0, 6.0, 8.0, 10.0
New format factors: 0.111, 0.222, 0.444, 0.554, 0.802, 0.950, 1.000

Fig. 3.7--Normalizing format factors quadratically to account for ceiling effects.

this cutoff point. The shape of this quadratic function is modelled by a parabola whose slope at the cutoff point ($F = 2.75$, $F' = 0.55/0.9$) equals that of the linear function (20%/90%) and equals 0.0 at the point where the old and new format factors have their maximum values ($F = 10.0$, $F' = 1.0$). As can be seen from the diagram, the cutoff point for these two types of adjustments is always a value halfway between that of the original format factor assigned to the theme's average format (1.0) and that of the largest original format factor for which a linear adjustment would have worked (in this case, 4.5). While this choice is somewhat arbitrary, it does insure that, beyond a certain point, a ceiling effect is modelled into the rate at which increasingly attractive formats raise an individual audience member's likelihood of exposure to a media message.[1]

c) User options with regard to format-response data

Let us now enlarge upon our original example by

---

[1] In practice we have found that when we set the cutoff point (i.e., the value of the initial format factor) between the linear and quadratic adjustment procedures too high, there exists no parabola which can fit such a sharply bending ceiling effect. We encounter the same problem when the maximum format factor initially specified by a researcher is too high, i.e., when it produces a theme audience in any medium significantly greater than the maximum possible theme audience specified by the researcher.

assuming that the hypothetical researcher wishes to define two different types of media in his simulation--Soviet newspapers and Soviet magazines. In a situation of this kind the simulation, as we mentioned above, could accept one set of relative likelihoods of men versus women and Party members versus nonParty members being exposed to newspaper articles on Party affairs and it could accept a different set of these relative likelihoods for magazine articles on Party affairs. But the present version of the simulation has been designed in such a way that it could not similarly accept one estimate of the average attractiveness of newspaper articles on Party affairs, along with the corresponding set of format factors for the various types of newspaper articles on that subject, and, at the same time, accept a different estimate of the average attractiveness of magazine articles on Party affairs, along with the corresponding set of format factors for the various types of magazine articles on that subject. Our hypothetical researcher would have to specify one average attractiveness figure for newspaper _and_ magazine articles on Party affairs, along with the corresponding set of format factors for the various types of newspaper _and_ magazine articles on that subject. The present version of the simulation would give him the option of specifying these theme- and format-response data in one of two ways: (1) He could specify the average percentage of Soviet newspaper and magazine readers exposed to an article on Party affairs and define the format factors for various types of newspaper and magazine articles on this subject in the standard fashion, i.e., so that they were normalized with respect to an article having this average attractiveness; (2) If the researcher were unable to estimate the average percentage of Soviet newspaper and magazine readers exposed to an article on Party affairs, then he could artificially set this figure at 100 per cent and define the format factors for various types of newspaper and magazine articles on this subject so that they were normalized with respect to an article having this artificially set average attractiveness. As the numerical example in Figure 3.8 suggests, using a set of format factors specified in either of these two ways the present version of the simulation would compute the correct probability of theme exposure for any type of Soviet newspaper or magazine reader confronted with any type of article on Party affairs.[1]

---

[1]Nevertheless, the fact that the simulation can only accept one estimate of the average percentage of a medium's audience exposed to a given theme does put an inconvenient restriction on the input data. It may happen that the researcher has assigned some messages format factors that are much higher than any others in the scenario, but that these messages appear in only one type of medium. The simulation is designed to compute conditional exposure probabilities in cells on the basis of the largest of these format factors, and it will do this for every medium in the scenario. But we have already seen how, for the audiences of some types of media, a relatively high format factor can constrain the allowable ratios of average theme-exposure probabilities on adjacent levels of any dimension. Thus, because the present version of the simulation can only accept one estimate of the average percentage of a medium's

Method #1: Used when the researcher is able to specify a theme's average attractiveness over all formats in both media types.

Average % of Soviet newspaper and magazine readers exposed to an article on Party affairs = 25%

Type of Article	Short News Item	Long Article	Editorial
Format Factor	0.8	1.0	2.0
Normalization Multiplier =	(25%) ÷	(2.0 x 25%) =	1/2
Normalized Format Factor	0.4	0.5	1.0

For the various types of readers of any individual newspaper or magazine average probabilities of theme exposure will be computed such that their weighted sum reproduces the percentage of that newspaper's or magazine's readership exposed to the most attractive type of article on Party affairs, i.e., 2.0 x 25% = 50% of that newspaper's or magazine's readership.

Method #2: Used when the researcher is unable to specify a theme's average attractiveness over all formats in both media types

Average % of Soviet newspaper and magazine readers exposed to an article on Party affairs is set equal to 100%

Type of Article	Short News Item	Long Article	Editorial
Format Factor	0.20	0.25	0.50
Normalization Multiplier =	(100%) ÷	(0.50 x 100%) = 2	
Normalized Format Factor	0.4	0.5	1.0

For the various types of readers of any individual newspaper or magazine average probabilities of theme exposure will be computed such that their weighted sum reproduces the percentage of that newspaper's or magazine's readership exposed to the most attractive type of article on Party affairs, i.e., 0.50 x 100% = 50% of that newspaper's or magazine's readership.

Fig. 3.8--Two equivalent ways of defining format factors in the present version of the simulation.

4. Distributing Soviet message-response characteristics over sample computer audiences

In the Soviet simulation we computed conditional probabilities of theme exposure using theme- and format-response data of the kind just described. We are unable to estimate an international news story's average attractiveness over all formats in all five types of media used in the Soviet simulation. But we were able to estimate, for each type of medium, the average percentages of the audience attracted to differently formatted international news stories, and we assumed that these aggregate format-response data applied to each of the individual themes in the scenarios for the Cuban crisis and the Kennedy assassination. The data were obtained in the following way:

---

audience exposed to a given theme, it can happen that (1) a researcher has to specify unrealistic ratios of average theme-exposure probabilities on adjacent levels of some dimensions for one type of medium in his scenario because he wants to use rather large format factors for messages appearing in a different type of medium in the scenario, or (2) a researcher has to eliminate all messages with large format factors from one type of medium in his scenario because, for the audience of another type of medium in the scenario, he wishes to use a particular set of ratios of average theme-exposure probabilities on adjacent dimension levels.

From the results of a newspaper-reading experiment conducted with some of the refugees who comprised the Comcom Leisure Study sample we obtained estimates of the relative attractiveness of different types of newspaper articles containing international news. For electronic media, on the other hand, our format factors related more to the time and place limits of availability of the media than to the actual nature of individual broadcasts. From a knowledge of the geographical distribution of the Soviet population and the geographical coverage of each of the news-carrying Soviet radio and television "programs" (counterparts of Western stations or networks), we were able to estimate the percentage of the total listenership or viewership during various periods of the day likely to have listened to or watched each of these programs. From broadcast schedules we obtained the likely number of newscasts over the various programs during each of these periods and, making some assumptions about the duplicated audiences between newscasts, we were able to allocate the estimated total listenership or viewership of any program during a given part of the day to each of the individual newscasts on that program during that period. In this manner we estimated format factors for international news items carried by the Soviet electronic media, and, in a similar fashion, we did the same for radio broadcasts beamed to the Soviet Union from abroad. Finally, from the results of the reading experiment we were able to estimate, for Soviet newspaper and magazine readers, ratios of average theme-exposure probabilities on adjacent levels of all five population dimensions, and from the results of the Leisure Study interviews we estimated these ratios, again on all the population dimensions, for the audiences of Soviet electronic media and for the audiences of radio beamed from abroad.

B. Summarizing the pattern of message appearances in the media

For each theme in the scenario pass II computes a conditional probability of theme exposure and a normalized format factor for every message-individual pair. In other words, pass II assigns message-response characteristics to a base population which, heretofore, had been described only in terms of its media-consumption traits. At this point, if the researcher has no data indicating the possibility of any departures from normal habits of media use and message response during the period covered by the scenario, then pass II can proceed directly to the computation of message exposure probabilities. However, if the researcher does have some information on, or wishes to speculate about, likely departures from normal media-use and message-response behavior during the relevant period, then pass II has the facility for incorporating these dynamics into an otherwise static representation of a real population. But before we proceed to describe how this is done, we must first discuss the scenario of media messages with which the base population is ultimately confronted. For it is the nature of these messages themselves which frequently dictates whether there are any deviations from regular habits of media use and message response in the base population.

1. Constructing a scenario of media messages

The device that we use to describe and summarize a stream of media messages over time is what we refer to as a scenario. In the present version of the simulation the scenario is just a long list of messages, each one of which is described by (1) its theme, (2) the time at which it appears, (3) the medium in which it appears, and (4) its format. The researcher divides the period of time encompassed by this stream of messages into a number of intervals or time periods.[1] The scenario must list the

---

[1]Each of these may be an hour, a day, a week, a month, etc., and the intervals need not be of equal duration.

number of themes which it contains, the number of time periods which it covers, and, for any theme, the number of messages which convey that theme during each time period. The list of messages in the scenario is organized so that all messages conveying the first theme appear first, all messages conveying the second theme appear next, etc., and within-theme messages are ordered chronologically. Each message in the scenario is represented by two numbers. The first, an integer, is the identification number of the medium in which the message appears. It may be the same sequence number that was assigned to that medium in pass I, or, if the researcher has decided to use some subset of these media in the scenario, it will be the new sequence number which he has assigned to that medium in pass II. The second number associated with each message is a positive fraction which represents the relative attractiveness of that message's format for the audience of the medium in which it appears. We have been referring to this number as the message's format factor. In order to illustrate how a stream of media messages is summarized for simulation purposes, we present in Figure 3.9 a hypothetical scenario of 23 messages conveying 3 themes over 5 time periods in 5 different media, with format factors ranging from 0.1 to 0.5.

2. Storage constraints

In describing pass I of the simulation we mentioned the fact that a fixed storage capacity put practical limitations on the number of media exposure probabilities which could be processed by the computer in any given run. Since the number of media exposure probabilities that have to be estimated and stored is a direct product of the number of persons and the number of media in the simulation, we were forced to assign a maximum allowable value to each of these parameters. As a result, pass I has been designed in such a way that it can estimate each of up to 3,000 simulated individuals' probabilities of being exposed to an average issue of each of up to 64 simulated media. In pass II of the simulation, however, a fixed storage capacity does not put a direct limitation on the number of message exposure probabilities which can be processed by the computer in any given run, because all of these probabilities do not have to be stored for the entirety of the run. Pass II computes message exposure probabilities for one theme at a time, There are 3 themes in the scenario.

There are 5 time periods in the scenario.

Time Period	1	2	3	4	5
Theme	Number of Messages				
1	2	3	2	1	0
2	1	2	1	2	1
3	0	1	2	3	2

Information which the simulation must have in order to identify the theme and time of appearance of each message in the scenario

Message	Medium ID No.	Format Factor
1	1	0.2
2	2	0.3
3	1	0.1
4	2	0.4
5	3	0.3
6	2	0.2
7	3	0.2
8	3	0.3
9	2	0.4
10	1	0.1
11	4	0.3
12	5	0.2
13	2	0.2
14	4	0.3
15	5	0.3
16	3	0.4
17	1	0.1
18	5	0.2
19	2	0.5
20	3	0.2
21	5	0.1
22	1	0.3
23	4	0.4

The messages in the scenario

Fig. 3.9--A hypothetical scenario of media messages.

cycling through all the simulated time periods before proceeding to the next theme in the scenario. Therefore, in order to produce cumulative exposure statistics for any theme at the end of each time period, the simulation need only store, by time periods, the message exposure probabilities for that theme.[1] So, in pass II, a fixed storage capacity puts practical limitations on (1) the number of message exposure probabilities that can be processed by the computer for any given theme, and (2) the number of simulated time periods over which they can be processed.[2] The number of message exposure probabilities

---

[1]Actually, the simulation has to store somewhat more than this because it computes duplicated exposure to the current theme and each of up to three other themes in the scenario. These others must always be the first themes in the scenario, so, in addition to storing the message exposure probabilities for the current theme for each time period, the simulation also has to store, for the duration of the scenario, each individual's level of exposure to each of the first three themes in the scenario at the end of each time period. Nevertheless, the bulk of the storage requirement is for the current theme's message exposure probabilities.

[2]Although a fixed storage capacity imposes no constraints on the maximum number of themes that can be included in any given run, the cost of computer processing time can be a limiting factor here. When there are a relatively large number of messages conveying any theme, say upwards of 1,000, we have found in practice that the cost of including more than a few such themes in one run is prohibitive. On the other hand, where there are only a small number of messages conveying each theme, say less than 100, many such themes can be included in one run at a reasonable cost.

that must be computed and stored for any given theme is a direct product of the number of persons in the simulation and the number of messages conveying that theme over the period covered by the scenario. We have already assigned a maximum allowable value to the former in pass I, so in pass II we must assign a maximum allowable value to the latter. We must also assign a maximum allowable value to the number of simulated time periods which can be included in any given run. Accordingly, pass II has been designed in such a way that, for any given theme, it can estimate each of up to 3,000 simulated individuals probabilities of being exposed to each of up to 1,800 simulated messages conveying that theme over as many as 60 simulated time periods in any of up to 64 simulated media.

3. Summarizing patterns of message appearance in Soviet media and in radio broadcasts beamed to the Soviet Union from abroad

In the Soviet case we made two simulation runs of pass II. In each run we assigned different message-response characteristics to a computer-stored sample of the Soviet population that had been produced by pass I, and in each run we confronted the resulting base population with a different scenario.

PAGES (S) MISSING FROM ORIGINAL

PAGES 301 AND 302 ARE MISSING

The first run of pass II was made for the purpose of simulating Soviet exposure to mass media messages during the period of the Cuban missile crisis. We confronted the sample computer population generated by pass I with a scenario which summarized the results of a content analysis of Soviet media material and of externally originated radio broadcasts transmitted to the Soviet Union during this period. The resulting scenario included the following seven themes:

--The U.S. naval quarantine of Cuba
--Reports of pro-Soviet reactions
--Reports of pro-U.S. reactions
--U.S. hostility towards Cuba
--Soviet agreement to remove their missiles from Cuba
--U.S. threats directed at the Soviets
--Soviet threats directed at the U.S.

The second run of pass II was made for the purpose of simulating Soviet exposure to mass media messages during the aftermath of President Kennedy's assassination. The scenario for this run summarized the results of a content analysis of the sources described above for the relevant period. It included the following four themes:

--The assassination of President Kennedy
--The swearing in of Johnson as President
--The assassination of Oswald
--The establishment of the Warren Commission

Each of these scenarios covered 10 time periods, each one of which corresponded to 24 hours of Moscow Central time. Specifically, they covered the periods running from 4:00 A.M. on October 23d to 4:00 A.M. on November 2d, 1962 and from 4:00 A.M. on November 22d to 4:00 A.M. on December 2d, 1963, respectively. Each scenario contained messages in all 56 of the media from pass I and, in each, the average percentage of a medium's audience exposed to any theme was set equal to 100 per cent, and all format factors and ratios were assigned the realistic values that had been estimated in the manner already described. Dynamic factors were incorporated in the Cuban crisis simulation to reflect the heightened rate of media consumption and the increased attentiveness to crisis-related items which we know to have occurred among the Soviet population between the third and fifth days of that crisis. In the simulation of Kennedy's assassination we used dynamic factors to reflect an immediate and sizable upsurge in rates of media consumption and an increased attentiveness to event-related items, followed by a gradual return to normalcy in both over succeeding days. We summarize both of these scenarios in Figure 3.10.

Cuban Missile Crisis

Moscow Central Time	Oct. 1962 23	24	25	26	27	28	29	30	31	Nov. 1962 1	Total
Theme				Number of Messages							
U.S. Naval Quarantine	210	436	517	607	-*	-	-	-	-	-	1,770
Pro-Soviet Reactions	85	371	407	400	386	-	-	-	-	-	1,649
Pro-U.S. Reactions	115	308	282	257	287	216	116	111	-	-	1,692
U.S. Hostility vs. Cuba	239	300	375	359	312	-	-	-	-	-	1,585
Soviet Agreement re Missiles	0	0	0	0	0	142	294	355	290	91	1,172
U.S. Threats vs. Soviets	114	173	117	107	62	18	60	22	60	21	754
Soviet Threats vs. U.S.	193	398	227	185	198	187	107	43	60	27	1,625

Assassination of President Kennedy

Moscow Central Time	Nov.1963 22	23	24	25	26	27	28	29	30	Dec. 1963 1	
Theme				Number of Messages							Total
Assassination of Kennedy	159	692	898	-	-	-	-	-	-	-	1,749
Johnson Sworn In	53	262	182	176	187	183	174	106	77	53	1,453
Assassination of Oswald	0	0	56	337	430	346	282	194	-	-	1,645
Warren Commission Established	0	0	0	0	0	0	0	0	168	191	359

*No additional messages were input because the maximum message capacity of the simulation would have been exceeded.

Fig. 3.10--Summarizing the stream of media messages in two Soviet scenarios.

C. Modifying media-consumption traits and message-response characteristics

We have described how media-consumption traits and message-response characteristics are assigned to the sample computer population, and we have also described the nature of the message scenario with which that population is ultimately confronted. There is one other task which the simulation performs before this confrontation actually takes place, and that is the superimposition of dynamic potentialities on the base population's stable habits of media use and message response. We now proceed to describe just how this is done.

1. As a function of exposure[1]

Often, in order to account for heightened or lowered interest in a theme, the researcher may wish to increase or

---

[1] In the present version of the simulation there are two noncell-defining attributes: "class of consumer for a given medium," which is assigned to individuals in pass I, and "exposure history," which is built up for each simulated individual in pass II. We have designed the simulation so that it can systematically modify an individual's media-consumption traits and message-response characteristics on the basis of his exposure history. But, because of the complexity of pass II and the limitations of a fixed storage capacity, we were unable to incorporate this same feature as a function of the individual's consumer class for a medium.

decrease individual exposure probabilities depending upon such matters as whether a person has been previously exposed to the theme, his exposure to other themes, etc. For example, we might have postulated that at the beginning of the Cuban missile crisis Soviet citizens just paid normal attention to the mass media, but that as soon as they heard about Kennedy's speech, the American charges, or the Soviet-American confrontation they became more alert, paid more attention to news, and in particular turned on foreign radio more. Thus, in the simulation, as soon as people were first exposed to these key themes, we would have wanted to raise their probabilities of further exposure. The present version of the simulation allows the researcher to make such modifications, i.e., to account for the kinds of changes in communications behavior which take place during any series of events such as a crisis. For this purpose, when the sample computer population is confronted with a scenario, we retain an index of each person's level of exposure to a limited number of themes which we shall hereafter refer to as "trigger themes." The researcher is given the option of modifying a person's probability of exposure to any theme in the scenario as a function of the person's level of previous exposure to that theme or to one or more of the trigger themes.

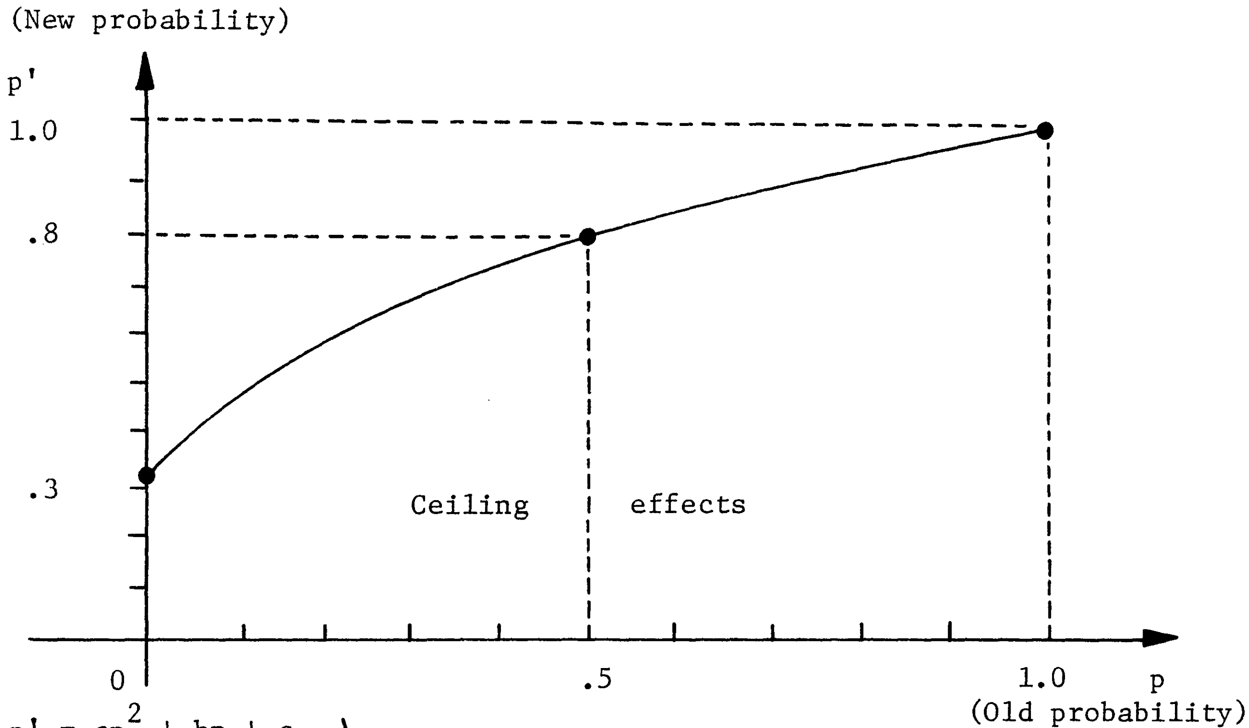
In the simulation we cannot retain each individual's exact number of exposures for every theme and time period because this would require an enormous computer storage capacity. Therefore, we have restricted trigger themes to (at most) the first three themes in a scenario, and we have used exposure classes rather than exact numbers of exposures to index each person's level of theme exposure. In order to simulate triggering based on the person's exposure class, the researcher must specify three levels of exposure which define the boundaries of four exposure classes. The lower boundary of the first exposure class is taken as zero exposures and the upper boundary of the fourth exposure class is taken as the total number of messages conveying the particular trigger theme. For example, if the researcher specifies 1, 2, and 3 exposures as the boundaries of four exposure classes, the latter would consist of 0-1, 1-2, 2-3, and 3-10 exposures, respectively, for a theme conveyed by 10 messages. For each trigger theme the researcher must also specify the exposure level (1, 2, 3, or 4) at which he wishes triggering to begin. The next step is to specify the different kinds of trigger modifications, of which there may be several. Each modification is identified by (1) its direction and magnitude, (2) the types of media for which it applies, (3) the subset of population types or cells over which it acts, and (4) one or more probability types to which it is applied. We shall discuss each of these in turn.

a) Specifying the direction of magnitude of a modification

If the researcher wishes to increase probabilities on the basis of a person's exposure class, he specifies the direction and the magnitude of this increase as a function of the current probability level by indicating what he desires to be the new values of the 0.5 and 0.0 probabilities. If he wishes to decrease probabilities on the basis of a person's exposure class, he specifies the new values of the 0.5 and 1.0 probabilities. By fitting a parabolic curve to these two parameters the simulation computes the new values of all probabilities between 0.0 and 1.0 in such a way as to approximate a ceiling or floor effect. An example of how this would be done is shown in Figure 3.11.

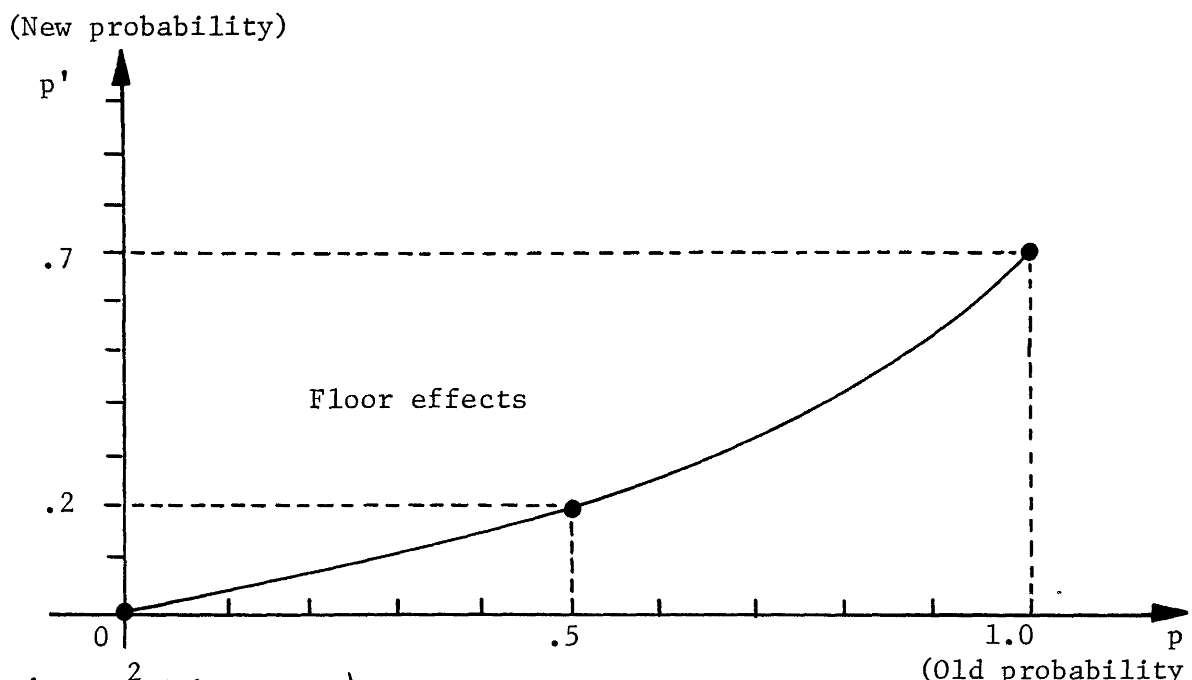
b) Specifying the types of media for which a modification applies

For triggering purposes the researcher may define as many as six different types of media and each trigger modification may apply to any number of these media types.



$$p' = ap^2 + bp + c$$

$$\left.\begin{aligned} 0 &= 2a + b \\ .8 &= .25a + .5b + c \\ .3 &= c \end{aligned}\right\} \qquad \begin{aligned} a &= -0.667 \\ b &= 1.333 \\ c &= 0.300 \end{aligned}$$



$$p' = ap^2 + bp + c$$

$$\left.\begin{aligned} 0 &= c \\ .2 &= .25a + .5b + c \\ .7 &= a + b + c \end{aligned}\right\} \qquad \begin{aligned} a &= 0.6 \\ b &= 0.1 \\ c &= 0.0 \end{aligned}$$

Fig. 3.11--Modifying exposure probabilities quadratically to account for ceiling or floor effects.

It is important to note here that the media types defined for trigger modifications need not be coterminous with any of the media types that were defined for the purpose of specifying ratios of average theme-exposure probabilities on adjacent dimension levels. However, the media types specified for triggering purposes <u>are</u> the types by which the simulation ultimately prints out exposure statistics after the sample computer population has been confronted with the scenario.[1]

c) Specifying the types of persons for which a modification applies

The population cells over which any trigger modification acts are specified by first listing all the population dimensions involved in any modification and then listing the sequence numbers for the cells involved in each individual modification. The overall sequence is established on the basis of the order in which the dimensions were first listed, varying the levels of the last-named dimension most rapidly, etc. For example, if "sex" (male, female) and "political involvement" (Communist,

---

[1]At the outset of pass II the researcher specifies the cells or cell-aggregates (e.g., "age" x "sex," "sex" x "education," and "age" x "sex" x "political involvement") and the media types (e.g., "newspapers" or media 1-32, "radio" or media 33-42, and "television" or media 43-46) by which he wishes exposure statistics printed out.

nonCommunist) were the only two dimensions affected by a particular trigger modification, then the sequence of cells would be as follows: (1) male, Communist; (2) male nonCommunist; (3) female Communist; (4) female nonCommunist.

d) Specifying the types of probabilities for which a modification applies

There are three types of exposure probabilities for which any trigger modification can apply: (1) the individual's pass I probability of exposure to a medium; (2) the individual's pass II conditional probability of exposure to a theme in its most attractive format; (3) the triple product of (1) and (2) and the message's format factor. A given trigger modification may apply to any one of these three probabilities, to any two of them, or to all three.

Finally, it is important to note that, when more than one trigger theme is specified, probabilities are modified on an "or" basis. If a person is above the exposure threshhold for trigger theme 1 <u>or</u> 2 <u>or</u> 3, his probability is modified.

2. As a function of time

Frequently, a researcher may wish to account for increased or decreased interest in a theme by modifying exposure probabilities as a function of time, i.e., as a function of the stage of the scenario, rather than on the basis of individual exposure histories. In this case he simply specifies any number greater than four as the exposure class at which probability modifications begin for each trigger theme. Because only four exposure classes are allowed in the simulation, this signals no modifications of exposure probabilities on the basis of individual exposure histories. He also specifies a number of time periods, which we shall hereafter refer to as "trigger times," in such a way as to identify the time at which each modification begins, its duration, and the time at which it ends. In the present version of the simulation three trigger "pulses" can be used. Each pulse requires the specification of four trigger times. The first specifies when all trigger modifications will be initiated, the second defines the time period by which all probabilities being modified will have reached their new values, as specified by the type of quadratic function described in Figure 3.11 above. The third trigger time determines when the simulation will begin to return these probabilities to their original values, and the fourth determines when they will have returned to their original values. In Figure 3.12 we illustrate how three trigger pulses can be established this way in the simulation.

Trigger times specified: $\underbrace{1\quad 2\quad 3\quad 4}_{\text{pulse 1}}$ $\underbrace{4\quad 6\quad 7\quad 9}_{\text{pulse 2}}$ $\underbrace{9\quad 10\quad 11\quad 12}_{\text{pulse 3}}$

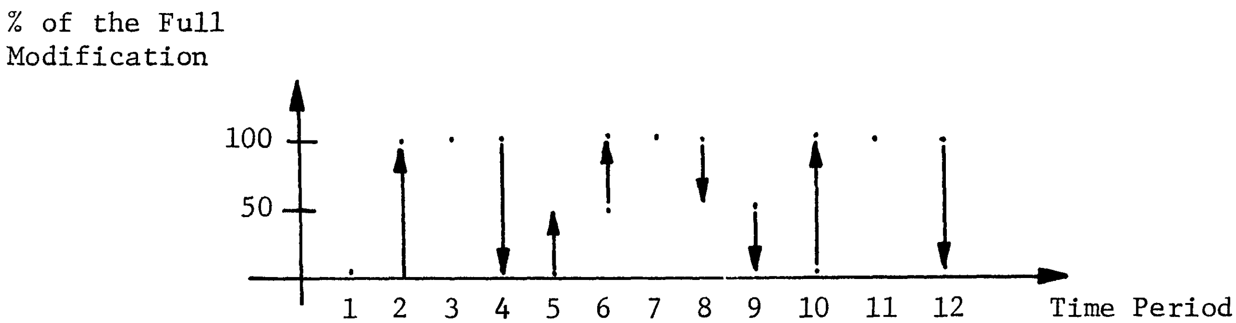


Fig. 3.12--Modifying exposure probabilities as a function of time.

When a pulse takes more than one time period to reach the full extent of its effect on probabilities, the amount of change which the simulation produces in probabilities is linear with time periods. In the second pulse appearing in Figure 3.12, for example, probabilities are raised one-half the specified amount in time period five and lowered one-half the specified amount in time period eight. Time-dependent probability modifications are associated with media types, population cells, and probability types in the same fashion as exposure-dependent modifications.

3. As a function of exposure and time

It may be that a researcher wishes to modify exposure probabilities <u>both</u> as a function of the individual's exposure history and of the stage of the scenario. Each such modification can have only one magnitude and direction that applies to exposure- and time-dependent changes alike. During the beginning phase of a trigger pulse (i.e., on the upslope) all individuals who reach one of the threshhold exposure classes have their probabilities fully transformed to the new values, regardless of what part of the way they may have already been triggered as a function of time. During this phase any individuals who have not had their exposure probabilities modified as a function of exposure class when a trigger time is at hand have their probabilities modified at that time by an amount which is some proportion of the full magnitude of the trigger modification. This proportion is a linear function of time, as we mentioned above. During the return phase of a trigger pulse (i.e., on the downslope) probabilities are modified only as a function of time. Figure 3.13 illustrates some patterns that can result under this set of decision rules. The dashed lines represent modifications of exposure probabilities as a function of exposure class and the solid lines represent modifications as a function of time.

D. Computing message exposure probabilities

In the final part of pass II the base population is confronted with the scenario. For each theme in the scenario the simulation cycles through simulated time periods, pairing each message which carries the theme with each person in the sample computer population. For any message-individual pair the simulation looks up or

Trigger times specified: 1 5 16 20

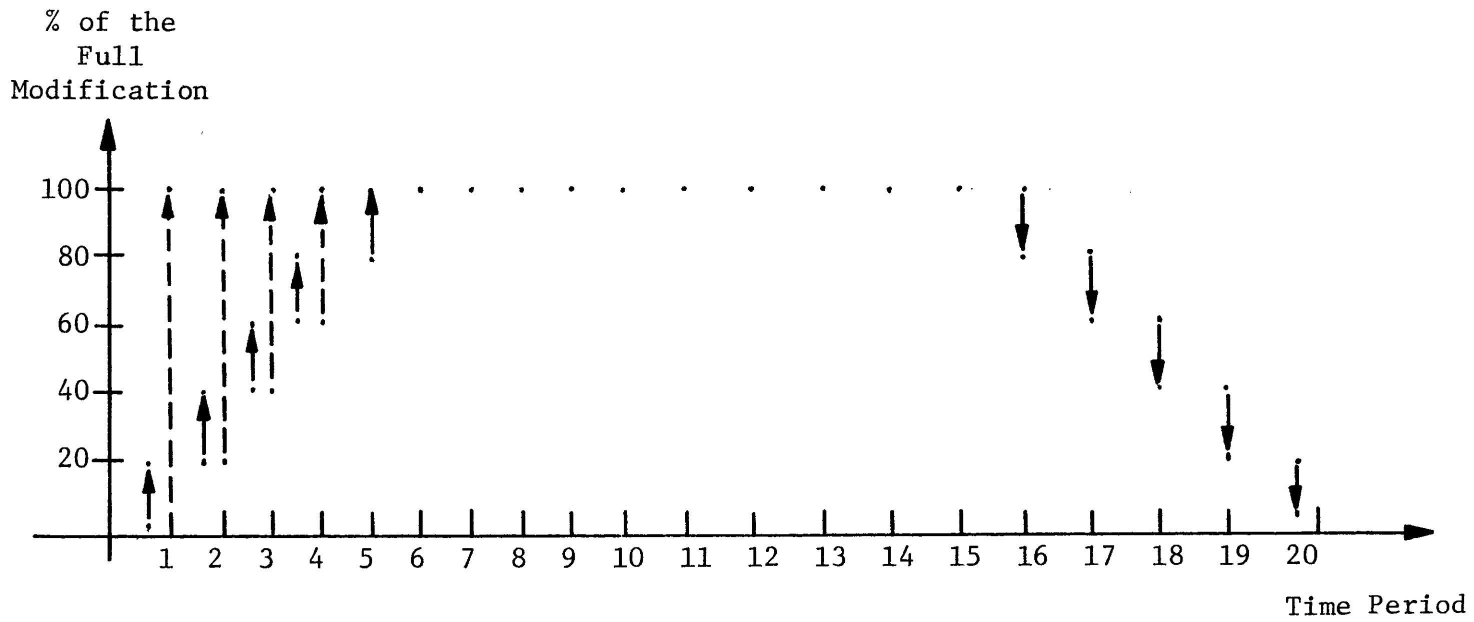


Fig. 3.13--Modifying exposure probabilities as a function of exposure and time.

calculates all the factors that affect the exposure probability for the pair. It does this in the following way: Using the individual's identification number, the simulation obtains his pass I probability of being exposed to the medium in which the message appears. Using the individual's cell number, the simulation obtains his pass II probability of being exposed to the theme in its most attractive format, given that he is exposed to the medium in which it appears. Then, the simulation uses the identification number of the medium in which the message appears, the individual's cell number, his exposure class with regard to any and all trigger themes, and the time period to determine (1) whether there is any trigger modification for the message-individual pair, and (2) if there is, what the magnitude of the change factor is and to which probability types it applies. If there is a trigger modification for the pair, then the simulation applies the appropriate change factor, either to the individual's pass I exposure probability for the medium, to his pass II conditional probability of exposure to the theme in its most attractive format, to the triple product of these two probabilities and the message's normalized format factor, or to any combination of these three probabilities. The simulation then stores, as the exposure probability for the message-individual pair, the resulting triple product of the pass I media exposure probability, the pass II conditional message exposure probability, and the normalized format factor. If there is no trigger modification for a message-individual pair, then the simulation stores, as the exposure probability for the pair, the triple product of the pass I probability, the pass II probability, and the normalized format factor which it initially obtained for the pair. The simulation follows this same basic procedure to compute, for each theme in the scenario, the exposure probability for every message-individual pair. In Figure 3.14 we illustrate the method by means of a flow diagram.

III. Summary of pass II

At this point it seems appropriate to review the principal tasks undertaken in pass II of the simulation. We do this by means of the following outline:

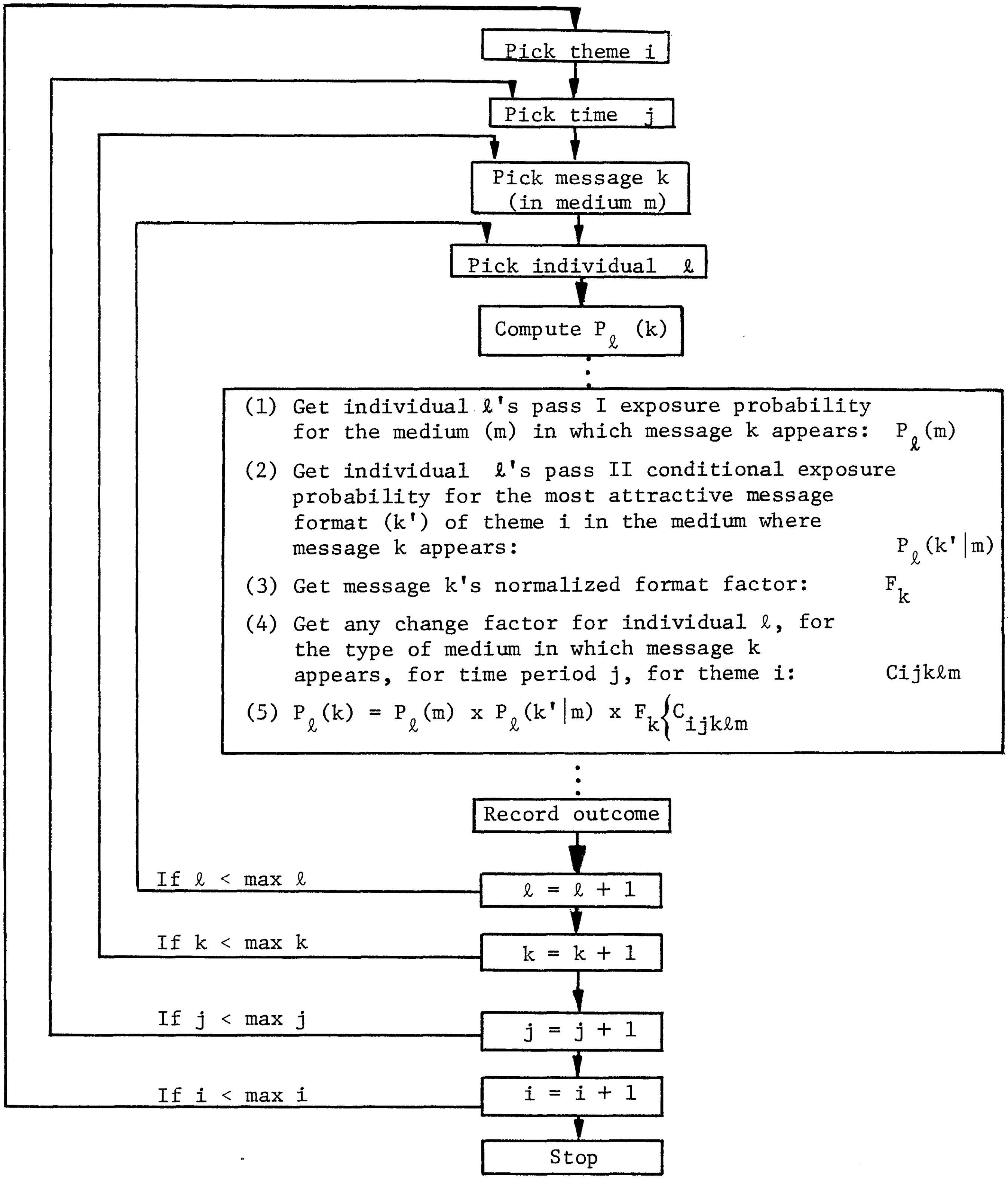


Fig. 3.14--Computing exposure probabilities for each theme's message-individual pairs.

A. Distribute message-response characteristics over each simulated medium's audience.

1. Use the cross-product technique to create a sample computer audience of each theme in its most attractive format in each medium, an audience over which demographic and social traits are distributed in a manner that is compatible with all reported theme-response data on those traits.

2. Obtain from this procedure the sizes of the simulated media's audiences of each theme (in its most attractive format) to be assigned to each cell, i.e., the mean theme-exposure probabilities in each cell for the members of each simulated medium's audience.

3. Normalize the format factors for each theme with respect to its largest format--linearly if the largest format factor does not produce a theme audience greater than a medium's audience, quadratically (with ceiling effects) if the largest format factor does produce a theme audience greater than a medium's audience--in a manner compatible with all reported format-response data.

4. Obtain from this procedure a normalized format factor for every format for each theme in the scenario.

B. Summarize a pattern of message appearances in the media.

1. Read in the summary properties of a scenario of messages in the media and read in the messages ordered by theme, and, for each theme, ordered by time period, in accordance with the results of a content analysis.

2. Obtain from this procedure a scenario of media messages, each of which is identified by the theme it conveys, the time period during which it appears, the medium in which it appears, and its format.

C. Modify the sample computer population's stable media-consumption traits and message-response characteristics.

1. For each theme in the scenario read in (1) the exposure classes for any other theme to which exposure triggers modifications in this theme's exposure probabilities, (2) the magnitude and direction of each such modification, (3) the types of media to which each applies, (4) the types of persons to which each applies, and (5) the probability types to which each applies.

2. For each theme in the scenario obtain from this procedure a change factor for each probability modification based on exposure level.

3. For each theme in the scenario read in the trigger times which describe the shape of each trigger pulse (the same for all themes) based on time period.

4. For each theme in the scenario obtain from this procedure a change factor for each probability modification based on time.

D. Compute message exposure probabilities

1. Confront the sample computer population with the scenario, i.e., for each theme (1) cycle through simulated time periods, pairing each message with each individual, (2) look up the individual's pass I probability of exposure to the medium, the individual's pass II conditional probability of exposure to the theme in its most attractive format, the message's normalized format factor, and any change factor, and (3) compute the exposure probability for the pair as the triple product of the pass I probability, the pass II probability, and the format factor, after they have been suitably modified by the change factor.

2. For every theme in the scenario obtain from this procedure the exposure probability for

every message-individual pair in each simulated time period.

A. Pass II and the availability of content analysis and audience response data

In reviewing the principal tasks undertaken in pass II we should emphasize that, like pass I, the second pass of the simulation is also designed to work with varying amounts of data, i.e., to operate in data-rich and data-poor situations. Pass II estimates each simulated individual's probability of being exposed to each message in a simulated medium by using whatever data are available (1) on the behavior of the media's audience members and (2) on the pattern of message appearances in the media. For example, pass II requires information on the response of the media's audience members to each type of theme in the scenario, but it can accept this data in varying amounts and forms. For each theme the user may specify the average percentage of a medium's audience exposed and, for the media's audience members, ratios of average theme-exposure probabilities on adjacent levels of every population dimension, or he may beg the question of a theme's average attractiveness (i.e., set it equal to 100 per cent of a medium's audience and have format factors reflect the influence of the theme as well as its format, as explained above) and specify ratios of average theme-exposure probabilities on as little as one population dimension. Regardless of how little or how much response data is specified for a given theme, the simulation will use it to distribute the media's audiences of the theme in its most attractive format across cells in such a way that the resulting conditional exposure probabilities in each cell are compatible with whatever response data have been specified for the theme.

The simulation's technique for summarizing the pattern of message appearances in media is another example of its ability to work with data in varying amounts and forms. Each message in the scenario is identified by its content, the time at which it appears, the medium in which it appears, and its format. Thus, depending on the number of messages in which the researcher is interested and on the comprehensiveness of his content analysis and format-response data, each individual message in the scenario may represent (1) a distinct "message event," such as a Khruhschev speech broadcast on Moscow Central Radio, program I, between 7:00 and 7:30 P.M., October 25, 1962, or (2) many message events which are treated as essentially the same, such as an editorial in any republic level Komsomol paper telling of the Soviet agreement to remove their missiles from Cuba.

Finally, the way in which the simulation superimposes dynamic factors on stable habits of media use and message response is a good example of its capacity to deal with varying kinds and amounts of information. If the researcher has no information about these dynamics during the period covered by the scenario, the simulation can estimate exposure outcomes purely on the basis of the parent population's stable predispositions that have already been assigned to members of the sample computer population. But if the researcher does have some idea of how exposure probabilities may have changed during the relevant period, the simulation can accept this kind of data in forms ranging from the sketchiest to the most detailed. For example, the researcher can specify as little as one trigger modification (say, by level of exposure to one trigger theme) which applies to one type of medium, one type of person, and one type of exposure probability. Or he can specify a large number of trigger modifications, some by exposure level, others by time period. The exposure-level modifications can each be triggered by different trigger themes and exposure thresholds, and the time period modifications can each have different magnitudes. Each modification can be associated with a different type of medium and can apply to different types of persons and exposure probabilities.

B. Inputs required

The following kinds of data are required as inputs for pass II of the simulation:

--For each theme in the scenario, audience-response data which indicate the average proportion of a medium's audience exposed to the theme (optional);

--For each theme in the scenario, audience-response data which indicate, for one or more types of media, the relative likelihood of audience members on each pair of adjacent levels of each population dimension being exposed to a given appearance of the theme;

--For each theme in the scenario, format-response data which, for any format in any medium, indicate either (1) the average percentage of that medium's audience exposed to the theme in that format divided by the average percentage of that medium's audience exposed to the theme, or (2) the average percentage of that medium's audience exposed to the theme in that format;

--A scenario of messages derived from content analysis data in such a way that each message is described by the theme it conveys, its time of appearance, the medium in which it appears, and its format;

--For each theme in the scenario, data on, or hypotheses about, departures from normal habits of media use and message response during the period covered by the scenario; these data or hypotheses must specify the magnitudes and directions of all such changes, the themes and exposure levels by which these changes are triggered, and the types of media, persons, and exposure probabilities for which each such modification applies (optional).

C. Outputs produced

The following output statistics are produced by pass II of the simulation:

- --For each theme in the scenario, the percentage of a medium's audience attracted to the theme in its most attractive format, as implied by the largest format factor and the size of the average theme audience read in;

- --For each theme in the scenario, the mean conditional exposure probability assigned to each cell for each medium, on the basis of the percentage of the medium's audience exposed to the theme in its most attractive format and the ratios of conditional theme-exposure probabilities on adjacent dimension levels read in for that type of medium.

The final set of output statistics produced by pass II are the most important ones in the simulation because they describe the actual exposure consequences of confronting the sample computer population with the scenario. They therefore merit some discussion.

The simulation program can generate an enormous number of exposure probabilities if we ask for them. For example, in a simulation which uses the maximum allowable parameter values for the number of persons and the number of messages, the program can print out, for each theme in the scenario, each of 3,000 individuals' exposure probabilities for 1,800 messages, which amounts to 5,400,000 individual exposure probabilities. This much data is clearly unassimilable, but even if it somehow could be assimilated, it would not be very useful in the form of exposure probabilities. As a result, we were faced with two problems in designing the portion of pass II which produces exposure-related output statistics. The first problem was to limit the maximum number of raw figures that would be printed out for any given analysis, and the second was to design an output routine which would not simply produce the exposure probabilities for message-individual pairs but would instead produce functions of those probabilities which provided a more macroscopic description of exposure outcomes.

Clearly, the most general solution to these problems would have been to store the exposure probabilities computed for all message-individual pairs, either on the disc or on tapes, and to design an all-purpose "output analyzer" which could provide the researcher with any exposure statistic he desired, as long as it was some mathematical function of the individual exposure probabilities. Unfortunately, the pressures of our research schedule prevented us from undertaking this important (but time-consuming) task. As a result, the present version of pass II is designed to print out the same basic set of exposure statistics on every run. We now proceed to describe how this set was chosen.

We have limited the number of raw figures that can be printed out at the end of pass II by decreasing the person and message multipliers in the following ways:
(1) Instead of printing out the exposure statistics for each theme by individual persons, we print them out by types of persons, i.e., by cells or cell-aggregates.
(2) Instead of printing out the exposure statistics for each theme by individual messages, we print them out by types of messages, i.e., by message-aggregates in a given medium or type of medium. We have insured that the output of pass II is a macroscopic description of exposure outcomes for any theme by computing the expected values of various exposure statistics for that theme from the exposure probabilities for all its message-individual pairs and by printing out these statistics instead of the exposure probabilities at the end of pass II. But even with the adoption of these techniques for reducing the universe of possible output statistics, the number of alternatives from which we had to choose was enormous. This can be seen from a simple substructuring of what may be thought of as the property space of "exposure to media messages," as illustrated in Figure 3.15. From this figure the reader can generate (as we did) most of the possible kinds of exposure statistics and compare them with the subset we have chosen to print out in the present version of the

Dimension	Unit of Target Aggregation	Content	Unit of Channel Aggregation	Time Interval	Method of Counting
Level					
1	a person	theme	medium	during Δt	total (duplicated)
2	a cell or cell-aggregate	pair of themes	type of medium	through t	net (unduplicated)
3	a population	.	–	.	average
.		.		.	.
.		.		.	.
.		.		.	.

This substructure defines 72 possible types of exposure statistics. (There are many more, as the dotted levels indicate.) Exposure statistics of type 1 could include as much as "the total number of exposures during each of 60 time periods by each of 64 media to each of n themes for each of 3,000 persons."

Fig. 3.15--Substructuring the property space of "exposure to media messages."

simulation. The latter are, for each theme and every time period, as follows:

- --the number of exposures by medium (i.e., during the time period);
- --the cumulative number of exposures by medium (i.e., through the time period);
- --the number of exposures by type of medium;
- --the cumulative number of exposures by type of medium;
- --the number in, and percentage of, each cell or cell-aggregate exposed;
- --the cumulative number in, and percentage of, each cell or cell aggregate exposed;
- --the number in, and percentage of, each cell or cell-aggregate exposed, by type of medium;
- --the cumulative number in, and percentage of, each cell or cell-aggregate exposed, by type of medium;
- --the average and total number of exposures in each cell or cell-aggregate, by type of medium;
- --the cumulative average and total number of exposures in each cell or cell-aggregate, by type of medium;
- --the cumulative number in, and percentage of, each cell or cell-aggregate exposed to the current theme <u>and</u> theme (1,2,3).

D. Basic assumptions

Some of the more important assumptions which underlie pass II of the Comcom simulation model include the following:

1. For any theme, the typically reported empirical percentage of the audience of a given type of medium exposed to that theme is an average over all types of messages conveying that theme in all media of that type.

2. For any theme, the typically obtainable empirical ratios of conditional theme-exposure probabilities on adjacent levels of any dimension for a given appearance of that theme in a particular type of medium are roughly constant over all types of messages conveying that theme in all media of that type.

3. When the individual probabilities of each person in a population being exposed to each message in a scenario are used to compute the expected values of aggregate exposure statistics within various population groupings, the resulting figures approximately equal the maximum likelihood estimates of the empirical values.

In this chapter and in the one which preceded it we have focused our attention on the various statistical algorithms and computer procedures which make up the Comcom simulation model. We are now ready to describe how this model was used to simulate Soviet mass media exposure.

CHAPTER IV

DISTRIBUTING SOVIET DEMOGRAPHIC, SOCIAL, AND MEDIA-CONSUMPTION TRAITS OVER A SAMPLE COMPUTER POPULATION

CHAPTER IV

DISTRIBUTING SOVIET DEMOGRAPHIC, SOCIAL, AND MEDIA-CONSUMPTION TRAITS OVER A SAMPLE COMPUTER POPULATION

Introduction

In this chapter we will describe how the first pass of the simulation was applied to available data on the Soviet media system--data on the population, the media which circulated among them, and the audiences of those media--to produce a computer-stored sample of the 1962-63 Soviet population. From our discussion in Chapter II the reader will recall that the first step of this procedure was to distribute exposure-related demographic and social traits over a sample computer population in the same way that they were distributed over the 1962-63 Russian population. We now proceed to describe how that was done.

Distributing Soviet Demographic and Social Traits Over A Sample Computer Population

Choosing a population base

Our initial objective was to construct a simulation population consisting of a number of hypothetical individuals distributed across all the "types" or "cells" formed by cross-classifying Soviet attributes that had been identified as relevant to the process of mass media exposure. Any cell would then contain a group of people identically defined, such as young, college-educated, urban, male members of the Communist Party.

The best available description of the 1962-63 Soviet population was the 1959 all-Union census.[1] Table 4.1 shows the marginal percentage breakdowns, on five attributes, of the adult (sixteen or more

---

[1]The Comcom Leisure Study interview lasted between two and two and one-half hours and was based on a schedule containing mainly closed questions. Professor Pool and members of the Comcom staff devised the questionnaire, which placed most of its emphasis on communications behavior. Between 1964 and 1967 a total of fifteen interviewers administered 112 of these schedules, in four languages, to Soviet emigrés and visitors to Western Europe. For her Ph.D. thesis Dr. Rosemarie Rogers performed a secondary analysis of 107 of these interviews, eliminating five of the coded schedules for various reasons. We have based some of the simulation parameter estimates on statistics adduced by Rogers in this analysis. Because of the small size of the sample, it seemed advisable that <u>all</u> parameter estimates derived from the Comcom Leisure Study data should rest on the same set of interview schedules. Therefore, we performed our own secondary analysis of the Leisure Study data on the same 107 schedules used by Rogers, even though eight additional interviews had been completed in the interim.

Table 4.1--Marginal percentage breakdowns, on five dimensions, of the Leisure Study sample and of the adult population of the Soviet Union as described by the 1959 census.[a]

Dimension	Leisure Study Sample (N=107)	Soviet Population (N=145, 331, 288)
Sex		
Male	70	42
Female	30	58
Age		
16-29	36	36
30-49	44	37
50+	20	27
Education		
<4 yrs.	0	34
≥ 4, <7 yrs.	12	28
≥ 7, ≤ 10 yrs.	48	34
>10	40	4
Political Involvement		
Party Member	10	6
NonParty Member	90	94
Residence		
Urban	79	50
Rural	21	50

[a]Taken from: Rogers, "The Soviet Audience," p. 19.

years of age) Soviet population as described by the 1959 census, and of the Comcom Leisure Study sample, from which most of our audience breakdowns were estimated.[1] It is clear from this comparison that urbanites, the better educated, and males were significantly overrepresented in the Leisure Study sample, while older people and Party members were slightly underrepresented. People with less than four years of education were not represented at all. Our ultimate objective was to convert the simulation results to exposure statistics for the 1962-63 Soviet population. Therefore, because of the unrepresentativeness of the Leisure Study sample, we used 1959 all-Union census figures, updated for the period 1962-63, to model the Soviet simulation population. Audience breakdowns derived from the Leisure Study interviews were, of course, adjusted appropriately for this different base population. We were then able to equate the simulation outputs with hypothetical rates of exposure in various subgroups of the Russian population.

Dimensions selected

For the Cuban crisis and Kennedy assassination simulations we would have liked to construct a sample computer population which reproduced, in microcosm, the distribution of the 1962-63 Soviet population across cells formed by all the attributes or dimensions significantly related to mass media exposure. However, our choice

---

[1] Itogi vsesoyuznoy perepisi naselyeniya 1959 goda; SSSR (results of the 1959 All-Union Census of the U.S.S.R.) (Moscow: Gosstatizdat, 1962).

of dimensions (and levels) was also constrained in the following ways:

1. If a dimension (such as eduation) or a dimension level (such as members of the Communist Party) was felt to be of particular explanatory value with regard to Soviet audience behavior, then we made every effort to include it among the population dimensions or dimension levels.

2. Dimensions and levels were restricted to those for which sufficient data was available to estimate the distribution of the population across cells.

3. Dimensions and levels were chosen in such a way that the product of the number of levels of each dimension did not exceed the 500-cell capacity of the simulation programs.

Bearing these considerations in mind, the dimensions (and levels) with which we chose to describe the Soviet simulation population were: sex (male, female), age (16-29, 30-49, 50+), education (<4 yrs., ≥ 4 <7 yrs., ≥ 7, ≤ 10 yrs., >10 yrs.), political involvement (Party member, nonParty member), and residence (urban, rural).

Describing the broad outlines of the Soviet mass media system in Chapter I, we cited the results of the Harvard study and a Komsomolskaya pravda poll as evidence that three dimensions--education, political involvement, and urban or rural residence--were among the most important determinants of a Soviet citizen's exposure to international news. In reviewing these two studies we found, for the period 1962-63, that

--frequencies of exposure to newspapers, magazines, television, and radio beamed from abroad increased with level of education as did the range of these types of media consumed,

--a favorable attitude toward the Communist regime and a willingness to be politically involved were positively correlated with media consumption, and

--frequencies and ranges of exposure with regard to magazines, domestic radio, television, the oral agitation network, and radio beamed from abroad were higher among urbanites than among ruralites (although these differences were diminishing over time).

The results of the Leisure Study interviews, which, as we have said, provided the basis for many of our estimated audience breakdowns, also showed the effects of education and political involvement on media exposure (Tables 4.2 and 4.3).

The findings of the Leisure Study interviews, the Harvard study, and the Komsomolskaya pravda poll indicated that sex and age differences with regard to media exposure were smaller than the differences associated with education, political involvement, and residence.[1]

Dimensions rejected

The 1959 census recorded another dimension--"social group"--which we knew was significantly related to Soviet audience behavior.

---

[1]Because the Soviet base population has been described by sex and age, a researcher (using the Comcom model) can incorporate in a simulation any data he may have on changes in habits of media use as a function of either variable. For example, if he were simulating the Soviet population's exposure to a series of newspaper articles about the possibility of lowering the age at which young men had to serve in the Russian army, he could incorporate in the simulation any notions he had about the extent to which males in the relevant age group might become more prone to read newspapers carrying these articles.

Table 4.2--Percentage of the Leisure Study sample reporting exposure to newspapers, magazines, and television, by education.[a]

Education	Newspapers (% who read every issue or most issues of at least one)	Magazines (% who read every issue or most issues of at least one)	Television (% who watched at least several times per month)
Higher (>10 yrs.)	91	79	56
Secondary (10 yrs.)	83	71	48
Less than Secondary (<10 yrs.)	81	60	35

[a]Taken from: Rogers, "The Soviet Audience," pp. 55 and 110. Party members are not included in the tabulation.

Table 4.3--Average number of newspapers and magazines to which Leisure Study respondents reported regular exposure[a] and percentage of the Leisure Study sample reporting access to television, by political involvement.[b]

Political Involvement	Newspapers (Av. no. read--every issue or most issues)	Magazines (Av. no. read--every issue or most issues)	Television (% who had access)
Party Members	2.1	2.9	73[c]
NonParty Members	1.5	1.3	58

[a]By "regular exposure" is meant that they read every issue or most issues of the publication.

[b]Calculated from: Rogers, "The Soviet Audience," pp. 52 and 105.

[c]Only respondents living in an area covered by a television network are included.

The importance of "social group" lay in the obvious relationship to "occupational standing," an attribute identified, in our review of the literature in Chapter I, as a key determinant of Soviet media consumption. We would therefore have liked to describe the simulation population by the "social group" dimension in such a way that all the occupations on a given level of this dimension could be expected to have a similar effect on media exposure, an effect which differed from that of the occupations on any other level. We could easily have done this by redefining the levels of the "social group" dimension in the Soviet census, if the occupations on each of them had been clearly specified. Unfortunately, this was not the case. The 1959 all-Union census is inconsistent in the number of criteria that are used to define different social groups: for two groups (independent farmers and collective farmers) it uses organization of work plus occupation. One of the social groups not defined by occupation--collective farmers--encompasses a number of occupations, ranging all the way from field workers to administrative-managerial personnel, and the results of at least one Soviet study show (not surprisingly) that these occupational sub-groups differ significantly in their communications behavior.[1] But the Soviet census gives us

---

[1]A. S. Duchal, "Izmenyeniye strucktura rabochevo i soobodnovo vremeni krestyan za gody sovyetskoy vlasti" (Changes in the Structure of Working and Free Time of Peasants in the Years of Soviet Power"), Voprosi Filosofiyi, No. 4 (1965), 74-80, cited in Rogers, "The Soviet Audience," p. 303, n. 1. The reader is referred to Appendix C of Rogers' thesis, pp. 300-304, for a more detailed analysis of the problems occasioned by the definition of social groups used in the 1959 Soviet census.

no information on the breakdown of collective farmers by occupation. For this reason we decided not to use "social group" as a cell-defining attribute of the Soviet simulation population.

We also considered describing the Soviet simulation population by two other dimensions recorded in the 1959 census--"native language" and "republic of residence." It is easy to envision communications scenarios in which one or the other of these attributes could become an important determinant of media exposure. However, for a combination of reasons, we decided not to describe the simulation population by either of these attributes. We were not so much interested in native language as in language of media consumption and there were some serious methodological problems in determining the latter from a knowledge of the former. However, even if we could have done so, the number of levels on this dimension--15 major nationality languages--when multiplied by the number of levels on each of the other dimensions, would have exceeded the 500-cell capacity of the simulation programs. Of course, the same was true of the 15 levels on the republic-of-residence dimension. However, two alternatives which might be explored in future Soviet simulations are (1) the use of a three-level language-of-media-consumption attribute (reading, listening, and viewing in Russian; reading in Russian, but listening, and viewing in some other language; reading, listening and viewing in some language other than Russian)[1] and (2) the use of either a two-level (RSFSR, nonRSFSR) or a six-level (RSFSR, Kazakhstan, Central Asian, Transcaucasian, Baltic, European) republic-of-residence attribute. We lacked the audience breakdowns for media and themes that would have been required as inputs if we had incorporated the two variables as cell-defining attributes in these ways.

Using the Mosteller technique to construct a sample computer population

As mentioned above, the dimensions (and levels) chosen to describe the Soviet simulation population were sex (male, female), age (16-29, 30-49, 50+), education (<4 yrs. ; ≥ 4, <7 yrs.; ≥ 7, ≤ 10 yrs.; >10 yrs.), political involvement (Party member, nonParty member), and residence (urban, rural). This combination of dimensions and levels divided the population into 2x3x4x2x2 = 96 types or cells. Four of the five dimensions were recorded in the 1959 all-Union census. Extrapolating these figures we obtained the approximate distribution of the 1963 adult population of the Soviet Union by sex, age,

---

[1]We could reduce the language variable to three levels by assuming that in 1963 a negligible proportion of the Soviet population consumed Russian-language electronic media and non-Russian-language printed media. The bases for this assumption would be that (1) it required greater fluency in Russian (as in any other language) to listen to and understand a news broadcast in that language than to read and comprehend news stories printed in Russian, and (2) the direction of language change or adoption in the Soviet Union was from the nationality languages to Russian.

education and residence (Table 4.4).[1] The fifth dimension chosen to describe the Soviet simulation population, membership or non-membership in the Communist Party, was recorded in an article appearing in a 1964 issue of the Party theoretical journal Partinaya zhizn.[2] From this article we obtained the distributions of the 1963 adult Soviet population by political involvement and sex, political involvement and age, and political involvement and education (Table 4.5). The 1959 all-Union census covered an adult Soviet population numbering 145,331,288. After this population base was enlarged to match the estimated average size of the 1963 adult Soviet population, the extrapolated census figures encompassed a population of 155,000,000.[3] Dividing this number by the 96 cells gave an average of 1.6 million members of the Soviet population per cell. Of course, the actual cell

---

[1]The two events we were simulating occurred in October of 1962 and November of 1963 respectively. It seemed reasonable to assume that the marginal breakdown of the adult Soviet population on each of the variables of interest had not changed significantly between the time of the 1959 census and November of 1963. It also seemed reasonable to assume that the 1963 Soviet population, mapped into computer storage, would provide as suitable a base population for the October 1962 scenario as for the November 1963 scenario. We made a similar assumption with regard to audience sizes for the various media, using for both scenarios estimates derived from 1963 circulation and set figures.

[2]"The C.P.S.U. In Figures (1961-64)."

[3]Between 1959 and 1963 the total Soviet population grew from 208.8 to 223.1 million persons. Assuming roughly the same proportional growth in the adult population over this period, in 1963 it would have numbered (223.1/208.8) x 145,331,288 $\cong$ 155 million persons (Narodnoye Khozyaystvo SSSR v 1964 godu [National Economy of the USSR in 1964] [Moscow: Izdatyel'stvo "Statistika," 1965], p. 7).

Table 4.4--Distribution of the adult population of the Soviet Union by sex, age, education, and residence according to the 1959 census.[a]

Education	Male 16-29	Male 30-49	Male 50+	Marginal Totals	Female 16-29	Female 30-49	Female 50+	Marginal Totals
				Urban				
<4 yrs.	0.43%[b]	0.81%	1.63%	2.87%	0.46%	2.63%	5.11%	8.20%
≥4,<7 yrs.	3.01	2.87	1.24	7.12	1.96	3.08	1.30	6.34
≥7,≤10 yrs.	5.20	3.70	0.82	9.72	6.31	4.73	0.90	11.94
>10 yrs.	0.63	0.73	0.34	1.70	0.88	0.74	0.19	1.81
Marginal Totals	9.27	8.11	4.03	21.41	9.61	11.18	7.50	28.29
				Rural				
<4 yrs.	1.18%	1.64%	3.68%	6.50%	1.74%	4.94%	9.04%	15.72%
≥4,<7 yrs.	3.62	2.94	1.28	7.84	2.92	3.24	0.74	6.90
≥7,≤10 yrs.	3.91	2.10	0.26	6.27	4.08	2.12	0.14	6.34
>10 yrs.	0.11	0.22	0.05	0.38	0.16	0.17	0.02	0.35
Marginal Totals	8.82	6.90	5.27	20.99	8.90	10.47	9.94	29.31

[a]Calculated from: Kramer, "The Population of the Soviet Union," Table I. (Kramer adjusted the 1959 census figures for the age breakdown 16-29.)

[b]The entries are percentages of the total population (N=145,. 331, 288).

Table 4.5--Distributions of the adult population of the Soviet Union by political involvement and sex, political involvement and age, and political involvement and education in 1963.[a]

	Party Member	NonParty Member	Marginal Totals
Male	4.56%[b]	37.88%	42.44%
Female	1.11	56.45	57.56
Marginal Totals	5.67	94.33	100.00

16-29	1.12%	35.50%	36.62%
30-49	3.21	33.41	36.62
50+	1.34	25.42	26.76
Marginal Totals	5.67	94.33	100.00

<4 yrs.	0.00%	33.20%	33.20%
$\geq 4, <7$ yrs.	1.58	26.61	28.19
$\geq 7, \leq 10$ yrs.	3.15	31.10	34.25
>10 yrs.	0.94	3.42	4.36
Marginal Totals	5.67	94.33	100.00

[a]Calculated from: "The C.P.S.U. In Figures (1961-64)."

[b]The entries are percentages of the estimated population in 1963 (N=155, 000, 000).

sizes varied both well above and well below this average figure, but it is obvious that we were estimating the sizes of most cells from very large census categories. In fact, our problem was to assign computer individuals to cells in such a way that the resulting five-dimensional table, if collapsed appropriately, would reproduce the cell frequencies in each of the empirical subtables described above. The reader will recall that this is one of the kinds of assignment problems for which we described the application of the Mosteller technique in Chapter II (p. , condition 1). Accordingly, we used this iterative assignment procedure to construct a five-dimensional computer representation of the 1963 Soviet population from one of its four-dimensional subtables and three of its two-dimensional subtables. In order to reduce the variance caused by stochastic procedures of the simulation (such as the approximation of cell means by the random assignment of probabilities to cells) we chose the size of the simulation population to be 1,200 computer individuals distributed across 96 cells or population types. Table 4.6 compares the actual marginal percentage breakdowns, on each dimension, of the 1963 adult Soviet population with the corresponding breakdowns produced by the Mosteller technique in the sample computer population. It can be seen that the marginal percentage breakdowns of the simulation population and the Soviet population are virtually identical on each dimension.[1]

---

[1]Among the five dimensions of our simulation population there were

$${}_5C_1 + {}_5C_2 + {}_5C_3 + {}_5C_4 + {}_5C_5 \text{ or } 5 + 10 + 10 + 5 + 1 = 31$$

possible interactions. Having been able to estimate one four-dimensional

Table 4.6--Marginal percentage breakdowns, on cell-defining dimensions, of the 1963 adult Soviet population and of the simulation population.

Dimension	Soviet Population[a] (N=155,000,000)	Simulation Population[b] (N=1,200)
Sex		
Male	42.4	42.4
Female	57.6	57.6
Age		
16-29	36.6	36.4
30-49	36.6	36.8
50+	26.8	26.8
Education		
<4 yrs.	33.2	33.2
≥4,<7 yrs.	28.2	28.4
≥7,≤10 yrs.	34.2	34.2
>10 yrs.	4.4	4.2
Political Involvement		
Party Member	5.7	5.7
NonParty Member	94.3	94.3
Residence		
Urban	49.7	49.8
Rural	50.3	50.2

[a]Calculated from: Kramer, "The Population of the Soviet Union," Table I.

[b]Calculated from computer printout.

Distributing Soviet Audiences Across Demographic And Social Strata of the Sample Computer Population

Having distributed exposure-related demographic and social attributes of the Soviet population over a sample computer population, we were ready to undertake the other major task of pass I: the assignment of Soviet media-consumption traits to the sample computer population. The first step in this procedure was, as explained in Chapter II, to distribute the media's audiences across cells in the sample computer population the same way that they were distributed across corresponding cells in the 1963 adult Soviet population. For every medium that we chose to include in the simulation, the object of this distribution procedure was to assign a given number of its

---

table and three two-dimensional tables for the Soviet population, we, in effect, knew 19 of these 31 interactions at the outset. An analysis of computer printout showed that the Mosteller technique not only reproduced the 5 correct marginal interactions in the simulation population, but also the 14 higher-order interactions implicit in the four input tables.

In Chapter II we presented two examples (n. , p. and n. , p.) to illustrate that the Mosteller technique could not converge on a solution unless all the input tables were consistent in a nonobvious way. From these two examples it should be clear that the essence of this consistency criterion is that the input tables describe <u>additive</u> properties. The dimensions we chose for the Soviet simulation population meet this criterion. For example, if Party members are better educated than nonParty members and urbanites are better educated than rural dwellers, it seems likely that urban Party members are better educated than urbanites as a whole or Party members as a whole. For this reason we feel confident that, if we had access to the original Soviet census tapes, we would find that the Mosteller technique, in correctly reproducing all 19 of the estimated interactions in the Soviet population, had also come very close to reproducing the remaining 12 interactions as well.

audience members to each cell of the sample computer population. The resulting number of audience members assigned to any cell, divided by the total number of persons that had been assigned to that cell, would then specify a mean probability of exposure (or audience rating) for the medium in that cell. We first performed this distribution task for print media.

Soviet Newspaper and Magazine Readership

Defining individual Soviet print media

In 1963 there were 6,791 different newspaper titles and editions published on various territorial-administrative levels of the Soviet Union. Table 4.7 shows the number of newspapers on each level and their total annual and per issue circulation figures. It can be seen that, in 1963, the Soviet press, planned as it was on a territorial-production basis, had a pyramidal structure. At the top of this structure were the few central or all-Union newspapers. These made up roughly two-fifths of the total per issue circulation of newspapers in the USSR and, because of their higher periodicity, nearly half the annual newspaper circulation. From the same source on which Table 4.7 is based we found that the volume of an individual issue of a central newspaper (i.e., its average circulation) was larger than that of most newspapers on the lower levels.[1] These characteristics reflect the leading role played by the all-Union

[1] Pechat' 1963, Table 24, pp. 59-60.

Table 4.7--Soviet newspapers published in 1963, by territorial-administrative level, number of editions, and total annual and per issue circulation.[a]

Territorial-Administrative Level	Number of Editions	Total Annual Circulation	Total Per Issue Circulation (In Thousands)
All-Union	23	47.36%[b]	33,433
Republic	148	17.03	15,492
SubRepublic	6,620	35.61	35,295
Autonomous Republic & *Oblast*, *Krai*, *Oblast* & *Okrug*[c]	374	20.09	14,638
City, *Rayon*[d] & Administrations of Operating *Kolkhozes*[e] and *Savhozes*[e]	2,192	13.65	15,072
House Organs[f] and *Kolkhoz*[g]	4,054	1.87	5,585
Totals	6,791	100.00	84,220

[a]Calculated from: *Pechat'1963*, Table 24, pp. 59-60.

[b]The entries are percentages of a total annual circulation of 18,310,796,000 copies.

[c]Administrative territories equivalent to provinces.

[d]Administrative territories equivalent to districts.

[e]Collective farms.

[f]Newspapers of factories, educational institutions, etc.

[g]Collective farm newspapers.

sector of the Soviet press, a role which we discussed in Chapter I. At the base of the Soviet press's pyramidal structure, both in circulation and importance as sources of international news, were the most numerous groups of publications--the factory and kolkhoz newspapers--and, more generally, all the papers published on levels below the Republic level.[1] As their circulation figures suggest, newspapers published on the Republic level played a role intermediate to that of the central and subRepublic papers, both in terms of reach and authoritativeness. This hierarchy of importance among different types of Soviet newspapers (with regard to volume and news-dissemination) had an important bearing on the way we conceptualized individual newspaper media for the simulation.

The simulation programs can process a maximum of only sixty-four communications media and their audiences. However, in our computer model we wished to simulate the Soviet audiences of all communications media likely to have carried international news during the period 1962-63. As a result, we were forced to exclude from the computer model as many irrelevant or unimportant types of newspapers as possible

---

[1] In Table 4.7 we have omitted wall newspapers. These were not usually printed but instead consisted of hand-written or painted slogans, typewritten material, and photographs or press cuttings pasted up and displayed on notice-boards or walls. According to Buzek, their only function in the early 1960's was to be "... agitator, critic and organiser in the microcosmos of smaller enterprises and offices, departments and workshops of large plants, institutions, ministries, etc." However, he does point out that, since 1956, the Party had been trying to revitalize wall newspapers and in smaller plants the latter began (in 1964) to replace factory newspapers with very small circulations (How the Communist Press Works, pp. 73-74).

and to represent, for the most part, groups or aggregates of Soviet newspapers as individual media in the simulation. In limiting the number of different types of newspapers to be represented we employed the following decision rules: (1) We excluded all Soviet newspapers that seemed unlikely to have carried timely stories about international news events, viz., physical culture papers, sports papers, and wall newspapers;[1] (2) We excluded all Soviet newspapers that were not likely to have been read by persons over 15 years of age, viz., Party publications for children;[2] (3) We excluded foreign newspapers because of their relatively small circulation within the Soviet Union.[3]

---

[1] In 1963 there were 11 physical culture and sports newspapers published in the Soviet Union, with a total circulation at one printing of 1.38 million copies, headed by the central or all-Union Sovietskiy sport (Soviet Sports), published six days a week (Pechat' 1963, p. 62).

For the following reasons we did not include wall newspapers as communications media in the two Soviet simulations: (1) We lacked circulation data for them. (2) Even if we had had circulation data, we did not have any reliable information that could have been used to convert them into readership estimates. (3) It did not seem that wall newspapers, given their organizational and production focus, could have been an important source of news for the Soviet population about either the Cuban missile crisis or the assassination of President Kennedy.

[2] In 1963 the Party published 24 newspapers for the pioneers, children between nine and sixteen years of age, with a circulation of 10.69 million copies, headed by the all-Union Pionierskaya pravda, published twice weekly with about 4.1 million copies at one printing (Pechat' 1963, p. 62 and the Comcom card file.). We excluded the entire circulation of pioneer newspapers from the simulation on the grounds that these publications probably were not important sources of information about the Cuban crisis or the Kennedy assassination for those in the adult age category.

[3] The printed word from abroad is increasingly, albeit still sparsely, available in the Soviet Union. Two thirds of the Leisure Study respondents, despite their unusual motivation to read foreign

However, even with these exclusions, the bulk of the Soviet newspaper circulation still remained to be accounted for in the simulation.

On the central level we represented as individual media in the simulation nine of the best known and most important Soviet newspapers: Pravda, Izvestia, Trud, Komsomolskaya pravda, Literaturnaya gazeta, Ekonomicheskaya gazeta, Selskaya zhizn, Nedelya and Krasnaya zvezda. Pravda, as the central organ of the Party, and Izvestia, as the official newspaper of the Government, stood above all other newspapers in their authoritativeness with, and influence upon, the entire Soviet population. In 1963 Pravda was published every day of the week. Izvestia, in addition to its Tuesday through Sunday editions, published a Monday supplement called Nedelya, which we included as a separate medium in the simulation. The other six all-Union newspapers which we represented as individual media were the leading publications of the "specialized press," i.e., those newspapers directed at, and serving, the (Party-defined) needs of distinct groups of people. Trud was the central organ of the Soviet trade unions, Komsomolskaya pravda the official organ of the Young Communist League--a group consisting of youth over the age of sixteen, Ekonomicheskaya gazeta the central paper covering economic, industrial

---

materials and their frequent knowledge of foreign languages, had never read a book published abroad, and almost half had never had access to a foreign magazine or journal. The Soviets have started publishing magazines of reprints of foreign materials, such as Inostrannaya literatura (Foreign Literature) and Za rubezhom (Abroad). The latter, started in 1960, had reached a circulation of 400,000 by 1964 (Pool, "Opportunities for Change").

and technical problems, Selskaya zhizn the all-Union agricultural paper, and Krasnaya zvezda the all-Union paper for the Armed Forces. All of these specialized newspapers published daily editions Tuesday through Sunday. Literaturnaya gazeta, the central organ of the USSR Union of Writers, was published three times a week. We combined the remaining central newspapers into two aggregate newspapers, published two and three times a week respectively, and represented each as an individual medium in the simulation.

On the Republic level we represented as individual media (1) the popular joint daily organ of the Party and Government for the Russian Federal Republic--Sovietskaya Rossia and (2) the two corresponding organs (combined) for the republic of Kazakhstan--Kazakhstanskaya pravda and Sotsialistik Kazakhstan. For purposes of aggregation we divided the other thirteen union republics into four groups, such that the republics in each group were geographically contiguous and demographically similar. The first of these groups included the central Asian republics of Turkmenistan, Uzbekistan, Kirghizistan, and Tadzhikistan; the second the Transcaucasian republics of Georgia, Armenia, and Azerbardzhan; the third the Baltic republics of Lithuania, Latvia, and Estonia; and the fourth the European republics of Byelorussia, the Ukraine and Moldavia. For each such Republic grouping we combined all the joint daily organs of the Party and Government and represented the resulting aggregate as one newspaper medium in the simulation. Finally, on the Republic level, we combined all komsomol papers into two aggregate newspaper media, published three and five times a week respectively, and we combined all remaining newspapers into four aggregate media, published one, two, three, and five times a week respectively.

On levels below the Republic level we did not represent any individual newspapers as individual media in the simulation. We combined all komsomol papers published on these levels into one aggregate newspaper medium, published three times a week, and we combined all remaining newspapers into six aggregate media, published one, two, three, four, five, and six times a week respectively.

In addition to the thirty newspaper media described above, we also included as individual print media in the computer model two Soviet magazines: the illustrated weekly Ogonyok, and the satirical magazine Krokodil, which appeared every ten days. In 1963 these two publications were among the most popular of Soviet magazines and seemed more likely to have carried timely commentary on international news than any other Soviet magazines.[1] Lastly,

---

[1] Although the annual Soviet magazine circulation had grown to 858.2 million by 1964 (Pechat' 1964, p. 68), there were only a few individual magazines with widespread popularity, and the circulation of these was relatively far behind comparable magazines in Western countries. Ogonyok and Krokodil were practically the only Russian-language magazines with political content that had broad general appeal. Two magazines for women, Rabotnica (Woman Worker) and Krestyanka (Peasant Woman) were, as their titles suggest, aimed at readers in distinct social classes and were published only monthly. The circulation of these four magazines (the four most popular ones) in 1961 was, in millions: Rabotnica, 2.5; Krestyanka, 2.2; Ogonyok, 1.85; Krokodil, 1.5 (Buzek, How the Communist Press Works, p. 78). Other Soviet magazines covered a wide range of topics but, for the most part, were aimed at audiences defined by a particular interest (science, literature, etc.) or a specialized occupational grouping (agricultural workers, transportation workers, etc.)

we excluded two important categories of print media from the simulation--other Soviet periodicals, and foreign magazines and journals. We did not include other Soviet periodicals because it was felt that their predominant concern with specialized topics, such as technical, scientific, industrial and agitational matters, together with their comparatively low periodicities, would have made them relatively unimportant sources of information on the two rapidly-diffused international news events we were simulating.[1] We did not represent foreign magazines and journals in the computer model because of their relatively small circulation within the USSR in 1963 and because of their low periodicities.[2]

Table 4.8 lists the periodicity, number of editions, and estimated average per issue circulation of each print medium in the simulation. By comparing the totals in this table with the corresponding totals in Table 4.7 it can be seen that, of all the Soviet newspaper editions published in 1963, our computer model represented:

---

[1]At the beginning of 1962 there were 950 Soviet periodicals and, with other similar types of publications, the total number of titles was 4,121. Their yearly one-issue circulation was 872 million. From figures published a decade earlier, it would appear that the approximate breakdown by subject matter was as follows: Party, politics, economics (5%); science, mathematics (4%); industry, technology (4%); agriculture (2%); medicine, public health (2%); education (2%); literature, arts (3%); press, bibliography (2%); miscellaneous (1%); agitators' notebooks, periodic reviews, annuals, technical reference publications and bulletins (75%). (Buzek, How the Communist Press Works, pp. 77-8).

[2]See p. above, n.

Table 4.8--Soviet print media in the simulation, by title or type, periodicity, number of editions, and estimated average per issue circulation in 1963.

Title or Type	Periodicity	Number of Editions	Estimated Average Per Issue Circulation (In Thousands)
		All-Union Newspapers	
Pravda	7 per week	1	6,700[a]
Izvestia	6 " "	1	5,400[a]
Trud	6 " "	1	1,550[b]
Komsomolskaya pravda	6 " "	1	3,850[c]
Literaturnaya gazeta	3 " "	1	1,159[d]
Ekonomicheskaya gazeta	6 " "	1	455[e]
Selskaya zhizn	6 " "	1	3,175[c]
Nedelya	1 " "	1	1,500[f]
Krasnaya zvezda	6 " "	1	1,850[g]
All Other Papers Published	2 " "	2	2,935[h]
All Other Papers Published	3 " "	6	1,432[i]
Totals		17	30,006
		All-Union Magazines	
Ogonyok	1 per week	1	2,350[j]
Krokodil	every 10 days	1	1,960[j]
Totals		2	4,310

Table 4.8--Continued

Title or Type	Periodicity	Number of Editions	Estimated Average Per Issue Circulation (In Thousands)
	Republic Newspapers		
Sovietskaya Rossia	6 per week	1	2,250[k]
Kazakhstan Party-Govt. Papers	6 " "	2	422[l]
Central Asian Party-Govt. Papers	6 " "	9	1,265[m]
Transcaucasian Party-Govt. Papers	6 " "	7	1,166[n]
Baltic Party-Govt. Papers	6 " "	6	1,237[o]
European Party-Govt.Papers	6 " "	6	2,459[p]
All *Komsomol* Papers Published	3 " "	13	594[q]
All Komsomol Papers Published	5 " "	11	1,274[r]
All Other Papers Published	1 " "	24	2,017[s]
All Other Papers Published	2 " "	23	975[t]
All Other Papers Published	3 " "	32	464[u]
All Other Papers Published	5 " "	13	202[v]
Totals		147	14,325

Table 4.8--Continued

Title or Type	Periodicity	Number of Editions	Estimated Average Per Issue Circulation (In Thousands
	Sub-Republic Newspapers		
All Komsomol Papers Published	3 per week	113	3,251[w]
All Other Papers Published	1 " "	2,125	133[x]
All Other Papers Published	2 " "	1,069	728[y]
All Other Papers Published	3 " "	1,675	8,618[z]
All Other Papers Published	4 " "	314	2,570[aa]
All Other Papers Published	5 " "	199	4,974[aa]
All Other Papers Published	6 " "	115	8,278[bb]
Totals		5,610	28,552

Table 4.8--Continued

[a] Source: Comcom card file.

[b]Estimated by interpolating the 1962 and 1964 per issue circulation figures obtained from the Comcom card file.

[c]Estimated by interpolating the 1960 and 1964 per issue circulation figures obtained from the Comcom card file.

[d]Estimated by applying the 54.5 percent growth in the average per issue circulation of all-Union newspapers between 1960 and 1963 (Pechat' 1963, Table 24, pp. 59-60) to the 1960 per issue circulation figure for Literaturnaya gazeta, obtained from the Comcom card file.

[e]Estimated by assuming that the January, 1963 per issue subscription figure of 387,000, obtained from the Comcom card file, represented approximately 85 percent of the total per issue circulation. See pp.   below for the rationale underlying this assumption.

[f]Estimated by assuming that the 1963 per issue retail circulation figure of 300,000, obtained from the Comcom card file, represented approximately 20 percent of the total per issue circulation, as did the estimated per issue retail circulation figure for the parent publication, Izvestia.

[g]Estimated by computing the approximate percentage growth in the average per issue circulation of all-Union newspapers between 1959 and 1963 (Pechat' 1963, Table 24, pp. 59-60) and by applying the inverse of the result to an estimated 1967 per issue circulation figure for Krasnaya zvezda, provided us by the Radio Liberty Committee.

[h]Estimated by interpolating the 1960 and 1964 per issue circulation figures for Pionierskaya Pravda (Pioneer truth), obtained from the Comcom card file, in order to approximate the 1963 per issue circulation for that twice-weekly all-union newspaper, and by subtracting the result from the total 1963 per issue circulation of twice-weekly all-Union newspapers, obtained from Pechat' 1963, pp. 62-63.

[i]Estimated by subtracting the approximate 1963 per issue circulation of the thrice-weekly, all-union Literaturnaya Gazeta (see note d above), from the total 1963 per issue circulation of thrice-weekly all-Union newspapers, obtained from Pechat' 1963, pp. 62-63.

[j]Estimated by applying the 22.5 percent growth in the average per issue circulation of all-Union newspapers between 1961 and 1963 (estimated from Pechat' 1963, Table 24, pp. 59-60) to the 1961 per issue circulation figure, obtained from Buzek, How the Communist Press Works, p.

Table 4.8--Continued

[k]Estimated by interpolating the 1962 and 1964 per issue circulation figures obtained from the Comcom card file.

[l]Estimated by applying the 100 percent growth in the average per issue circulation of republic newspapers between 1956 and 1963 (Pechat' 1963, Table 24, pp. 59-60) to the sum of the 1956 circulation figures for Kazakhstanskaya pravda and Sotsialistik Kazakhstan, obtained from the Comcom card file.

[m]Estimated by applying the 100 percent growth in the average per issue circulation of republic newspapers between 1956 and 1963 to the sum of the 1956 circulation figures, obtained from the Comcom card file, for Turkmenskaya iskra (Turkmen Spark), Sovet Turkmenistany (Soviet Turkimenistan), Pravda vostoka (Truth of the East), Kyzyl Uzbekistan (Red Uzbekistan), Sovietskaya Kirgizia (Soviet Kirglizstan), Sovietik Kyrgyzstan (Soviet Kirghizstan), Kommunist Tadzhikistana (Tadzhikistan Communist), Sovet Tochikistoni (Soviet Tadzhikistan) and Tochikistoni Soveti (Soviet Tadzhikistan).

[n]Estimated by applying the 100 percent growth in the average per issue circulation of republic newspapers between 1956 and 1963 to the sum of the 1956 circulation figures, obtained from the Comcom card file, for Zarya Vostoka (Eastern Dawn), Kommunisti (Communist), Kommunist (Communist), Sovetakan Aistan (Soviet Armenia), Bakinskiy rabochiy (the Baku Worker), Kommunist, and yet another Kommunist.

[o]Estimated by applying the 100 percent growth in the average per issue circulation of republic newspapers between 1956 and 1963 to the sum of the 1956 circulation figures, obtained from the Comcom card file, for Sovietskaya Litva (Soviet Lithuania), Tiesa (Truth), Sovietskaya Latviya (Soviet Latvia), Cina (Fight), Sovietskaya Estonia (Soviet Estonia) and Rahoa Haal (People's Voice).

[p]Estimated by applying the 100 percent growth in the average per issue circulation of republic newspapers between 1956 and 1963 to the sum of the 1956 circulation figures, obtained from the Comcom card file, for republic level Komsomol papers published 3 times a week.

[q]Estimated by applying the 100 percent growth in the average per issue circulation of republic newspapers between 1956 and 1963 to the sum of the 1956 circulation figures, obtained from the Comcom card file, for republic level Komsomol papers published 3 times a week.

[r]Estimated by applying the same procedure described in note j to all republic level Komsomol papers published 5 times a week.

Table 4.8--*Continued*

[s]Estimated by applying the percentage growth in the average per issue circulation of republic newspapers between 1956 and 1963 to the 1956 per issue circulation figures obtained from the Comcom card file, for republic level pioneer papers published once a week, and by subtracting the resulting total per issue circulation of these papers from the total 1963 per issue circulation of republic newspapers published weekly (*Pechat' 1963*, pp. 62-63).

[t]Estimated by applying same procedure described in note s to republic newspapers published twice a week.

[u]Estimated by subtracting the approximate 1963 per issue circulation of republic level *Komsomol* papers published 3 times a week (see note g above) from the total 1963 per issue circulation of republic newspapers published 3 times a week (*Pechat' 1963*, pp. 62-63).

[v]Estimated by applying the same procedure described in note s to republic newspapers published 5 times a week.

[w]Estimated by subtracting the approximate 1963 per issue circulation of all central and republic level *Komsomol* papers (see notes c, q, and r) from the 1963 per issue circulation of all *Komsomol* papers (*Pechat' 1963*, p. 62).

[x]Estimated by summing the 1963 per issue circulation figures for *Kray*, *Oblast*, *Okrug*, Autonomous Republic and *Oblast*, City, Collective Farm Administration, *Rayon*, House organs and *Kolkhoz* weekly newspapers (*Pechat' 1963*, pp. 62-63), and by subtracting from this sum the estimated per issue circulation of weekly pioneer papers published on subRepublic levels. The latter was computed by subtracting the 1963 per issue circulation of all central and republic level pioneer papers, obtained from the Comcom card file, from the 1963 per issue circulation of all pioneer papers (*Pechat' 1963*, p. 62), and assuming that half of the resulting per issue circulation pertained to weekly pioneer papers.

[y]Estimated by applying the same procedure described in note x to newspapers published twice a week.

[z]Estimated by summing the 1963 per issue circulation figures for *Kray*, *Oblast*, etc. newspapers published 3 times a week (*Pechat' 1963*, pp. 62-63), and by subtracting from this sum the approximate 1963 per issue circulation of *Komsomol* papers published 3 times a week on subRepublic levels (see note w).

Table 4.8--Continued

[aa]Estimated by summing the 1963 per issue circulation figures for *Kray*, *Oblast*, etc. newspapers published with the appropriate periodicity (*Pechat' 1963*, pp. 62-63).

[bb]Estimated by summing the 1963 per issue circulation figures for *Kray*, *Oblast*, etc. newspapers published 6 times a week (*Pechat' 1963*, pp. 62-63), and by subtracting from this sum the estimated 1963 per issue circulation of subRepublic level physical culture and sports papers. The latter was computed by subtracting the estimated 1963 per issue circulation of the central sports paper (computed by applying the all-Union press's per issue circulation growth rate between 1960 and 1963 to the 1960 per issue circulation figure for *Sovietskiy sport*, obtained from the Comcom card file) from the 1963 per issue circulation of all sports and physical culture papers (*Pechat' 1963*, p. 62), and by assuming that the resulting per issue circulation pertained to papers published only on subRepublic levels.

--17 of 23 all-Union editions, comprising about 90 per cent of the total per issue circulation of all-Union newspapers,

--147 of 148 Republic editions, comprising about 92 per cent of the total per issue circulation of Republic newspapers, and

--5,610 of 6,620 subRepublic editions, comprising about 81 per cent of the total per issue circulation of sub-Republic newspapers.

Thus, our computer model included a total of 5,776 of the 6,791 Soviet newspaper titles and editions published in 1963, comprising about 87 per cent of the total average per issue newspaper circulation during that year.

Estimating the sizes of single-issue readerships

In the Soviet simulation we defined each edition of a newspaper or magazine as an issue of that publication, and we defined the average readership of any edition as the average single-issue audience of that publication. Before estimating how the average single-issue readership of each of the thirty-two print media in the simulation might have been distributed across the ninety-six population cells in 1963, we first had to estimate the magnitude of this readership, i.e., the average number of persons who normally read an edition of the publication in 1962-63. We now proceed to describe how that was done.

In general, there is a straightforward way to estimate the per issue readership of any newspaper or magazine from its per issue circulation figure. One simply multiplies the latter by the estimated average number of persons who read an individual copy of a typical issue. However, in the Soviet case we were forced to develop a somewhat more complex method of estimating single-issue readerships, because we had no information bearing directly on the average number of readers per copy for individual Soviet newspapers and magazines. Instead, we had two related types of data for Soviet print media as a whole.

First, we had information suggesting what proportion of the 1963 per issue circulation of Soviet newspapers and nonspecialized magazines might have been sold by each of three possible methods: institutional subscription, (i.e., a subscription by a library, reading room, culture house, club, place of work, dormitory, etc.), individual subscription, and retail sales (via stores, newsstands, etc.). Based on this information we assumed that in the early 1960's about eighty-five per cent of the total per issue circulation of Soviet newspapers and nonspecialized magazines was sold by subscription (either to individuals or to institutions), and the rest by retail. We also assumed that approximately fifteen per cent of the total subscription of these publications was made up of subscriptions by institutions.[1]

---

[1] According to Soviet sources, in the early 1960's approximately 75-85 per cent of the total Soviet newspaper and magazine circulation was sold by either individual or institutional subscription and the rest by retail. Buzek cites the figure of "about 75%" for 1961 and, during this period, Bogdanov and Vyazemskiy stated that "up to 85% of the individual circulation of central and local newspapers and magazines was distributed by subscription, the remaining 15% by retail," (How the Communist Press Works, p. 233, quoting the Soviet periodical Razprostraneniye pechati [Dissemination of the Press], [October 19, 1961], p. 11, and Spravochnik Zhurnalista, 1961, p. 590, both cited by Rogers, "The Soviet Audience," p. 32, n. 3). With regard to the percentage of the total Soviet newspaper and magazine

The second type of data we had related each of the four possible methods by which a copy of a Soviet print medium could be obtained--institutional subscription, individual subscription, retail purchase, pass-on--to the medium's likelihood of being frequently read by a person who obtained it in that way and to the likelihood of its being

---

subscription made up of subscriptions by institutions, Rogers cites the estimate of 10 per cent, made by a foreign correspondent of Ekonomicheskaya gazeta for his own newspaper, as representative of the majority of newspapers and nonspecialized magazines ("The Soviet Audience," p. 33).

In estimating single-issue readerships for the print media in the simulation we assumed a slightly higher proportion of the total subscription (fifteen percent) was made up of institutional subscriptions and we used the higher estimate (eight-five percent) of the total per issue circulation sold by subscription. Our reason for choosing these two values was that, when combined with the other data available, they produced a readership estimate for each individual print medium in the simulation, and thus for print media as a whole, which averaged out to 2.75 adult readers per copy. We had selected this figure (somewhat arbitrarily) as a target because it exceeded, by what seemed to be a reasonable amount, the average number of adult readers per newspaper copy in the United States. For example, a 1961 study of newspaper reading in the United States found a national average of 2.04 adult readers per newspaper copy (Audits and Surveys Company, Inc., A National Study of Newspaper Reading: The Functions of Newspapers for Their Readers [New York: Audits and Surveys Company, Inc., 1961]).

In a Western country such as the United States, an average readers-per-copy ratio reflects (1) the economic forces of the market for print media and (2) the average number of adults per household. But in the Soviet case, enforced supply of, and unsatisfied demand for, specific print media have been a frequent occurrence in the recent past, and we know that the manipulation of supply still occurred to some degree in 1963. Also, the well-known housing shortage in the Soviet Union undoubtedly meant that there were a greater average number of adults per household there than in the United States in 1963. Both of these factors suggest a higher number of readers per copy in the USSR than in the U.S. However, it seems reasonable to assume that with the lifting of ceilings on subscriptions, around 1960, the average number of adult readers per newspaper copy in the Soviet Union began to diminish with the result that, by 1963, it was gradually approaching (but still greater than) readers per copy ratios in the passed on by him to others. This data was in the form of answers to the following two questions from the Leisure Study interview: (1) "How did you normally get each of your journals and newspapers? Subscribed, bought at store or stand, at organization meeting, at culture house or club, at library or reading room, at work, or passed on to you by another person? This person who gave it to you was himself: The original recipient of the journal, or had received it by pass on?" (2) "When you were finished with it, did you usually pass your magazine or newspaper on to someone else? Yes, no, or sometimes but not regularly?" Comcom respondents answered both of these questions for each newspaper or magazine which they indicated they had read while living in the Soviet Union. The results, in the form in which we used them for converting per issue circulation figures to per issue readership estimates, are summarized in Table 4.9.[1]

United States and other Western countries. We cite two facts in support of this assumption: (1) The lifting of subscription ceilings is known to have resulted in a spectacular rise in the circulation figures of certain Soviet newspapers and magazines (see, e.g., Rogers, "The Soviet Audience," p. 40, n. 2); (2) Answers to questions in the Comcom Leisure Study as to whether respondents would have liked to subscribe to more newspapers or magazines than they did, referred mostly to inadequate access to foreign publications. While a number of respondents did cite cost as an obstacle to additional subscriptions, they generally referred to magazine subscriptions (Rogers, "The Soviet Audience," p. 40, n. 3).

[1] The unrepresentativeness of the Leisure Study sample, its small size, and the closed form of the questions on readership frequency, while troublesome, did not prevent us from deriving usable per issue readership estimates from answers to the two readership questions on the Leisure Study interview schedule. The small sample size problem was overcome by computing average readership rates for newspapers as a whole and for magazines as a whole, and applying them uniformly to the various print media in the simulation. The

Table 4.9--Relationship between four ways of obtaining a newspaper or magazine, regularity of exposure to it, and likelihood of passing it on.

% of Publications That Were Regularly Read[a]	(N^d)	Obtained By:	% of Publications That Were Passed On[b]	(N^d)	% of Regularly-Read Publications[c]
		Newspapers			
88%	(56)	Individual Subscription	50%	(49)	33%[h]
85	(69)	Institutional Subscription[e]	0[g]	(53)	35
76	(41)	Retail Purchase[f]	25	(34)	21
73	(22)	Pass-On	33 1/3	(21)	11
		Magazines			
100%	(40)	Individual Subscription	65%	(40)	27%[i]
86	(80)	Institutional Subscription[e]	0[g]	(89)	48
75	(32)	Retail Purchase[f]	38 1/2	(39)	17
40	(30)	Pass-On	59 1/2	(37)	8

Table 4.9--Continued

[a]Adapted from: Rogers, "The Soviet Audience," Table II.9, p. 74. By "regularly read" is meant that every issue or most issues of the publication were read by the respondent.

[b]Calculated from an independent tabulation of Comcom survey results made by the author. The N's differ from those in column two because (1) less respondents answered the question on ways of disposing of a print copy than the one on ways of obtaining a print copy, and (2) a few periodicals of another type were inadvertently included in the magazine count.

[c]Calculated from: Rogers, "The Soviet Audience," Table II.8, p. 73.

[d]Totals on the basis of which percentages were calculated.

[e]Publications obtained at place of work, library, reading room, culture house, club, dormitory, etc.

[f]Publications purchased at stores, newsstands, etc.

[g]Publications obtained by institutional subscription obviously can not be passed on to others in the same sense as can publications obtained by individual subscription, retail purchase, or pass-on.

[h]The entries are percentages of the duplicated total number of individual newspaper titles regularly read by members of the Comcom sample (N-148).

[i]The entries are percentages of the duplicated total number of individual magazine titles regularly read by members of the Comcom sample (N=142).

The estimation procedure

A concrete example is perhaps the simplest way to illustrate how we used the circulation estimates in Table 4.8, together with the two sets of data described in the preceding paragraph, to estimate the average single-issue readership of each Soviet print medium in the simulation. In Figure 4.1 we illustrate how this was done for the all-Union youth paper Komsomolskaya pravda. The basic procedure was characterized by three sets of simplifying assumptions. First, as the example suggests, we applied the total and institutional subscription rates, assumed for Soviet newspapers and nonspecialized magazines as a whole, to each newspaper and magazine medium in the simulation. This approach, which ignores differences in subscription rates across individual print media, was dictated by the absence of reliable data on which to base estimates of the magnitudes of these

---

closed form of the question relating respondents' regular readership rates to the method of obtaining a publication was no problem because these rates could be computed for each group obtaining the medium a different way ("subscribed" = individual subscription; "bought at store or stand" = retail purchase; "at organization, at culture house or club, at library or reading room, at work" = institutional subscription; "passed on to you by another person" = pass-on). The regular readership and pass-on rates for differently obtained print media, computed as they were from the answers of Comcom respondents, undoubtedly were distorted somewhat by the overrepresentation of the educated, urbanites and males in the sample. However, we multiplied these rates by circulation and subscription figures that were based on the Soviet population as a whole. It seemed reasonable to assume that the resulting per issue readership estimate for any print medium in the simulation--tied as it was to the medium's estimated per issue circulation and subscription figures, and to the approximate regular readership rates among groups of persons obtaining the medium in different ways--was more accurate than any estimate based solely on Comcom respondents' average readership rate for that medium or type of medium.

Name of print medium: Komsomolskaya pravda

Estimated 1963 average per issue

Circulation:			3.85 million
Subscriptions: 85% x 3.85		3.27	
Institutional subscriptions: 15% x 3.27 =	0.49		
Individual subscriptions: 85% x 3.27 =	2.78		
Retail sales: 15% x 3.85 =		0.58	
Pass-ons from individual subscribers: 50% x 2.78 =	1.39		
Pass-ons from retail consumers: 25% x .58 =	0.15		
Pass-ons from original consumers: 1.39 + 0.15 =		1.54	
Pass-ons from pass-on consumers: 33 1/3% x 1.54 =		0.51	
Pass-ons: 1.54 + .51 =			2.05
Readership from institutional subscribers: 85% x 15 x 0.49*	= 6.26		
Readership from individual subscribers: 88% x 2.78	= 2.45		
Readership from retail consumers: 96% x 0.58	= .44		
Readership from pass-on consumers: 73% x 2.05	= 1.49		
Readership:			10.64 million (6.9%)

*Based on an estimate of 12 persons having access to an average institutional copy of a magazine (see pp. for source).

Fig. 4.1--Estimating the 1963 average per issue readership of *Komsomolskaya pravda*.

differences. It undoubtedly produced a certain amount of error in the total and institutional subscription estimates for some of the print media in the simulation. But the reader will recall that the estimated total per issue circulation of all thirty-two of these media comprised about eighty-seven per cent of the average 1963 total per issue circulation of all Soviet newspapers and nonspecialized magazines. We therefore assumed that the uniform application of average subscription rates estimated for this type of medium as a whole to each individual medium of this type in the simulation would not produce a significant error in the total and institutional subscription estimates for the thirty-two print media as a whole.[1]

A second set of simplifying assumptions is implicit in the way we used regular readership and pass-on rates derived from the Leisure Study interview data. As the example in Figure 4.1 indicates, in the absence of fuller data, we assumed that the uniform application of average pass-on and regular readership rates (for Soviet newspapers as a whole) to each newspaper medium in the simulation, together with the uniform application of corresponding rates (for Soviet magazines as a whole) to each magazine medium in the simulation,[2] would not

---

[1] To be more specific, we assumed that no significant error would be produced in the duplicated sum of these estimates over the thirty-two print media.

[2] Unfortunately, we could not compute regular readership and pass-on rates for <u>nonspecialized</u> Soviet magazines as a whole, because the bulk of the magazines cited by Comcom respondents were of a specialized nature. As a result, we did not use the regular readership and pass-on rates in the "magazine" portion of Table 4.9 when estimating the per issue readerships of <u>Ogonyok</u> and <u>Krokodil</u>. Because

produce a significant error in the number of pass-ons per issue and in the readership per issue estimated for the thirty-two print media as a whole.[1] However, the validity of this assumption rested not only on the fact that the estimated total per issue circulation of print media in the simulation comprised the bulk of the average 1963 per issue circulation of all Soviet newspapers and nonspecialized magazines. It depended also on the validity of the additional assumption that the regular readership and pass-on rates derived from Leisure Study interview data, although based on the duplicated total number of newspaper or magazine titles cited by respondents, were fairly representative of corresponding rates based on the total number of copies per issue, both for Soviet newspapers as a whole and for Soviet magazines as a whole.

The third set of simplifying assumptions which characterized our technique for estimating average single-issue readerships is implicit in the way these estimates were computed. It suffices to describe the method for newspapers alone because an identical procedure was followed for the two magazine media in the simulation. We assumed that the total and institutional subscription rates and the regular consumption and pass-on rates for Soviet newspapers as a whole could be regarded as the probabilities, averaged over many issues of many Soviet

---

both of these magazines were of a nonspecialized nature, we used instead the rates estimated for newspapers as a whole, assuming that they would be closer to the actual values for general interest magazines.

[1]Here again we assumed that no significant error would be produced in the duplicated sum of these estimates over the thirty-two print media.

newspapers, that an individual copy of a paper undergoes each of these processes. Accordingly, in order to obtain what amounted to expected value estimates of the total number of subscribers and the number of institutional subscriptions to any newspaper medium in the simulation, we multiplied its circulation and total subscription figures by the appropriate rates or "mean probabilities" (0.85 and 0.15 respectively), as illustrated in Figure 4.1 above. The number of retail consumers of the newspaper was then computed by subtracting the total number of subscribers from the estimated per issue circulation, and the number of individual subscribers to the newspaper was computed by subtracting the number of institutional subscriptions from the total subscription.

The next step in the estimation procedure was to determine the total number of persons to whom copies of an average issue of the newspaper were passed on, either by original recipients of the paper or by other pass-on recipients. In order to obtain an expected value estimate of the total number of pass-ons by the initial recipients of any newspaper medium in the simulation, we multiplied the number of individual subscribers and the number of retail consumers by the appropriate pass-on rates for these groups (0.50 and 0.25 respectively) and summed the two products. (Persons having access to an institutional subscription were not considered able to pass a copy of the paper on to someone else.) In order to obtain an expected value estimate of the total number of pass-ons by pass-on recipients of the newspaper, we multiplied the number of first-round pass-on recipients of the paper by an assumed pass-on rate for this group (0.33).[1] The total number of pass-on recipients of the paper was then obtained by summing the number of pass-ons by initial recipients of the paper and the number of pass-ons by pass-on recipients, as illustrated in Figure 4.1 above.

---

[1]In reality, 33 1/3% was the average pass-on rate for <u>all</u> pass-on recipients of a newspaper, as estimated from Leisure Study data. Therefore, because we applied this rate only to the number of first-round recipients of a newspaper in order to estimate the total number of additional pass-on recipients of that paper, it may seem that we underestimated the total number of pass-on recipients per issue for most papers. One might argue that, with a target figure of 2.75 readers per average copy for newspapers as a whole, we should have treated each newspaper copy as if it had two rounds of pass-on recipients. In that case we would have multiplied the first round of pass-on recipients by the inflated pass-on rate of 50% in order to produce a 33 1/3% pass-on rate for all such recipients of newspapers. However, even though we did not follow this procedure we are fairly confident that our method did not underestimate the total number of pass-on recipients per issue for most individual papers, and especially for newspapers as a whole. The 2.75 readers-per-copy ratio we were aiming at was an assumed average over all kinds of newspaper copies, including institutionally-subscribed copies. As can be seen in Figure 4.1, we estimated that there were about 13 readers per average institutional copy (85% x 15) for newspapers as a whole (see pp. of the text for the source of this estimate). With approximately 13% of the total per issue newspaper circulation made up of institutional copies (15% x 85%), we estimated the average number of readers per non-institutional copy as follows:

$$(13\%)\ (13) + (87\%)\ (x) \cong 2.75$$

$$x \cong 1.22 \text{ readers per non-institutional copy}$$

In other words, it would appear that only about 1.6 persons had access to the average non-institutional copy of a newspaper (100 [1.54])/ [3.85 - 0.49] passed it on to others. If one assumes that there were seldom more than two rounds of pass-ons, then it can be seen that the application of the 33 1/3% pass-on rate to the first round of pass-on recipients reproduces the estimated total of 1.6 recipients (original plus pass-on) per average non-institutional copy. However, this procedure does imply a somewhat lower average pass-on rate (25%) for all pass-on recipients than that estimated from the Leisure Study sample (33 1/3%). But this can be explained by the quite plausible assumption that most Comcom respondents, when relating how they

The final step in the estimation procedure was to compute the average single-issue readership. For any newspaper this figure is simply the sum of the per issue readerships within the four groups of persons obtaining a copy of the paper in each of the possible ways. Therefore, in order to derive an expected value estimate of the total number of readers of an average issue of any newspaper medium in the simulation, we multiplied the estimated number of persons obtaining a copy of that paper by institutional subscription, individual subscription, retail purchase, and pass-on by the appropriate regular readership rates for these groups (0.85, 0.88, 0.76, and 0.73 respectively). Then, as illustrated in Figure 4.1 above, we took the sum of the four resulting products as the approximate average single-issue readership of that newspaper.[1]

---

disposed of the newspapers they received by pass-on, answered in terms of newspapers they obtained from original recipients rather than from pass-on recipients. Because of the nature of the bias in the Leisure Study sample, persons who received newspapers at third (or more) hand were probably underrepresented. As a result, the pass-on rate computed for Comcom respondents who obtained newspapers by pass-on may well have been more representative of the rate for first-round pass-on recipients of newspapers than for any higher-round group of pass-on recipients.

[1]Implicit in this procedure is another simplifying assumption. The readership rates which had already been tabulated from Leisure Study data were based on regularly read newspaper titles. By using these available rates, and only these rates, to compute single issue readerships, we were, in effect, estimating the magnitude of any newspaper's per issue readership as one-hundred per cent of its regular readers (persons reading every issue or most issues) plus zero per cent of its occasional readers (persons reading only an occasional issue). We assumed that this technique would not result in a significant overestimation of the single-issue readership for most individual newspaper media in the simulation, and, especially, for newspapers as a whole. An alternative procedure would have been to subtract

One additional aspect of this estimation procedure requires explanation. We attempted to estimate the average number of persons having access to a copy of an institutionally subscribed Soviet newspaper in 1963. To make this estimate we used the data summarized in columns one and six of Table 4.9 above, and we employed the following computational technique:

Let N_{ins} = the total no. of newspaper copies per issue obtained by institutional subscription,

N_{ind} = the total no. of newspaper copies per issue obtained by individual subscription,

R_{ins} = the total no. of institutionally subscribed newspaper copies regularly read,

R_{ind} = the total no. of individually subscribed newspaper copies regularly read,

X = the average no. of persons having access to an institutionally subscribed newspaper copy.

Then $N_{ins}/N_{ind} \cong 15/85$ $\qquad$ $(85\%)\ (x)\ N_{ins} \cong R_{ins}$

$R_{ins}/R_{ind} \cong 35/33$ $\qquad$ $(88\%)N_{ind} \cong R_{ind}$

So $X \cong 6$ persons per copy

Fig. 4.2--Estimating the average number of persons who had access to an individual copy of an institutionally subscribed Soviet newspaper in 1963

---

each of these regular readership rates from one-hundred per cent in order to obtain readership rates based on occasionally read newspaper titles. Then, for any newspaper medium, we would have estimated not only the number of persons obtaining that medium each way who regularly read it (as in Figure 4.1), but also the numbers of persons obtaining that medium each way who occasionally read it. Finally, in order to estimate the medium's total per issue readership, we would have made some arbitrary assumption about what proportions of its regular and occasional readers were in the average single-issue readership.

However, to at least one student of the Soviet scene, an estimate of 6 Russians having access to an average copy of a newspaper subscribed to by a club, dormitory, library or work place in 1963, appeared somewhat low.[1] If the estimate is, in fact, low, it may be due to the overrepresentation of the better educated in the Leisure Study sample. Because of this bias, blue collar workers, who for the most part worked at relatively large institutions (such as factories and collective farms), were underrepresented, while white collar workers and professionals, most of whom probably worked or studied in relatively moderate- or small-sized institutional settings (such as stores, libraries, dormitories, etc.), were overrepresented. In addition, it seemed likely that (1) the ratio of regularly-read newspapers obtained by institutional subscription to regularly-read newspapers obtained by individual subscription would have been smaller among white collar workers and professionals than among the blue collar working class, and (2) the relative probability of an individually subscribed versus an institutionally subscribed newspaper copy being regularly read by a person would have been smaller, on the average, among white collar workers and professionals than among blue collar workers.[2]

---

[1]Rogers regards this estimate as low. Pool, on the other hand, finds it somewhat more plausible than the estimated 15.0 persons per copy which we actually used in the simulation.

[2]Because individual subscriptions cost money, and because this commodity is dearest on the lower levels of the class structure, it would seem likely that obtaining a newspaper by individual subscription would be much more highly correlated with regular readership of that paper among the blue collar working class than among white collar workers or professionals.

As we mentioned in Chapter I, magazines were, in the early 1960's disproportionately read by the Soviet educational elite. This was also the most highly overrepresented group in the Leisure Study sample. It therefore seemed reasonable to assume that an estimate of the average number of persons per institutionally subscribed copy, based on Comcom respondents' regular readership rates, would be more valid for magazines than for newspapers. Accordingly, we carried out the estimation procedure in Figure 4.2 using the Leisure Study sample's regular consumption rates for magazines. The result was an estimated average of twelve persons per copy for institutionally subscribed magazines. Reasoning that the corresponding figure might be somewhat higher, on the average, for newspapers and for the two general-interest magazines in the simulation, we assumed an average, in 1963, of fifteen persons per institutional copy, both for Soviet newspapers and for nonspecialized Soviet magazines. In estimating single-issue readerships we applied this figure uniformly to each and every print medium in the simulation, even though it obviously represented an average over all Soviet print media (and subscribing institutions). For reasons already discussed, we assumed that, with regard to the thirty-two print media as a whole, this approach would not produce a significant error in the resulting per issue estimate of the number of persons having access to institutionally subscribed copies.

Plausibility of the estimated readership sizes

Table 4.10 lists two different estimates of the average per issue readership of each Soviet print medium in the simulation. One set of estimates is based solely on readership data from the Leisure Study, i.e., it is based on Comcom respondents' answers to questions on their daily reading habits. It was derived by assigning to the average single-issue readership of a print medium 90 per cent of the proportion of the Leisure Study sample who said they read "every issue" of that title or type of medium, 70 per cent of the proportion of the sample who said they read "most issues," and 20 per cent of the proportion of the sample who said they "occasionally" read an issue. The other set of estimates was obtained by the more complex method described above. It is therefore based on (1) the answers to questions relating Comcom respondents' ways of acquiring print media to their regular readership and pass-on rates for those media (Table 4.9), (2) assumed total and institutional subscription rates for Soviet newspapers and nonspecialized magazines as a whole (85 and 15 per cent, respectively), and (3) estimated per issue circulation figures for the thirty-two print media in the simulation (Table 4.8).

A comparison of the two sets of estimates not only provides evidence for the reasonableness of the set derived by the more complex method; it also suggests the plausibility of subtotals of these estimates for print media published on the all-Union Republic, and subRepublic levels. The total of the single-issue readership

Table 4.10--The average per issue readership of each Soviet print medium in the simulation estimated two ways.

Title or Type	Average Per Issue Readership: Based on Leisure Study Alone	Average Per Issue Readership: Based on Leisure Study Assumed Subscription Rates, and Estimated Per Issue Circulation Figures
All-Union Newspapers and Magazines		
Pravda[b]	23.4%[a]	11.8%
Izvestia	22.2	9.2
Trud	2.5	2.8
Komsomolskaya pravda	10.8	6.9
Literaturnaya gazeta	10.9	2.1
Ekonomicheskaya gazeta	0.0	0.8
Selskaya zhizn	1.0	5.7
Nedelya[c]	1.5	2.6
Krasnaya zvezda[d]	0.7	1.8
All Other Papers Published 2 Times a Week[e]	3.8	5.2
All Other Papers Published 3 Times a Week	1.8	2.5
Ogonyok[f]	20.7	4.2
Krokodil	10.9	3.5
Totals	110.2	59.1

Table 4.10--Continued

Title or Type	Average Per Issue Readership: Based on Leisure Study Alone	Average Per Issue Readership: Based on Leisure Study Assumed Subscription Rates and Estimated Per Issue Circulation Figures
	Republic Newspapers	
Sovietskaya Rossia	.8%	4.0%
Kazakhstan Party-Govt. Papers[g]	.8	0.7
Central Asian Party-Govt.Papers	2.5	2.2
Transcaucasian Party-Govt.Papers	2.3	2.1
Baltic Party-Govt. Papers	2.4	2.2
European Party-Govt. Papers	4.7	4.4
All *Komsomol* Papers Published 3 Times a Week	1.2	1.1
All *Komsomol* Papers Published 5 Times a Week	2.5	2.3
All Other Papers Published 1 Time a Week	3.9	3.6
All Other Papers Published 2 Times a Week	1.9	1.7
All Other Papers Published 3 Times a Week	.9	0.8
All Other Papers Published 5 Times a Week	.4	0.4
Totals	24.3	25.5

Table 4.10--Continued

Title or Type	Average Per Issue Readership: Based on Leisure Study Alone	Average Per Issue Readership: Based on Leisure Study Assumed Subscription Rates and Estimated Per Issue Circulation Figures
	SubRepublic Newspapers	
All Komsomol Papers Published 3 Times a Week[h]	1.9%	5.8%
All Other Papers Published 1 Time a Week	1.2	3.6
All Other Papers Published 2 Times a Week	0.4	1.3
All Other Papers Published 3 Times a Week	4.8	15.4
All Other Papers Published 4 Times a Week	1.5	4.6
All Other Papers Published 5 Times a Week	2.9	8.9
All Other Papers Published 6 Times a Week	4.7	14.8
Totals	17.4	54.4

Table 4.10--Continued

[a]Estimates represent percentage of the 1963 adult Soviet population.

[b]We knew the 1963 subscription figures for Pravda, Izvestia, and Ekonomicheskaya gazeta. Thus, when we estimated the average per issue readerships of these three papers by the more complex method, we used the known subscription figures instead of multiplying estimated 1963 per issue circulation figures by the assumed average subscription rate (eighty-five per cent) for that year.

[c]We knew the retail sales figure for Nedelya. Thus, when we estimated the average per issue readership of this paper by the more complex method, we subtracted the known retail sales figure from the estimated 1963 per issue circulation figure instead of multiplying the latter by the assumed average subscription rate for that year.

[d]In estimating the average per issue readership of Krasnaya zvezda by the more complex method, we assumed there were no institutional subscriptions to that paper.

[e]In order to estimate the average per issue readerships of the two aggregate all-Union newspaper media based on the Comcom survey alone, we first computed the unduplicated total readership of all central papers cited by Comcom respondents (Table 4.9), except (1) sports papers, (2) pioneer papers, and (3) the nine individual titles included as separate media in the simulation. Then, after adjusting this figure for frequency of readership in order to estimate the total per issue readership, we divided the resulting figure between the all-Union aggregate newspaper medium published twice a week and the one published three times a week in proportion to the estimated total per issue circulations of both types of publications (Table 4.8). These two circulation figures were also used to estimate the average per issue readerships of both aggregate all-Union newspaper media by the more complex method. Thus, there is an error factor in all four of these estimates because they do not account for duplicated readership between the individual newspapers which make up the two aggregate all-Union media. The first method, by dividing the total Comcom readership between both aggregate all-Union newspapers according to their duplicated total per issue circulations, assumes that the ratio of the duplicated to the unduplicated total readership is about the same for both newspaper groupings. The second method, based as it is on an estimate of the duplicated total per issue circulation for each aggregate paper, assumes that the total readership duplication is negligible in each grouping. However, neither of these assumptions could have been far wrong. Because each of the major all-Union print titles was represented as an individual medium in the simulation, and because of

the realities of multiple newspaper readership (even in the Comcom sample few persons were regularly exposed to more than two newspapers, as can be seen in Rogers, "The Soviet Audience," Table II.6, p. 52), there probably was very little readership duplication between the individual newspapers which made up the two aggregate all-Union papers. In any event, whatever error was produced in the per issue readership estimates for these two media by ignoring duplication must certainly have been a small percentage of the total readership estimate for the thirty-two print media as a whole.

[f]In estimating the average per issue readerships for the two general-interest magazines, Ogonyok and Krokodil, by the more complex method, we used the pass-on and regular readership rates computed for Soviet newspapers as a whole rather than the corresponding rates computed for Soviet magazines as a whole, because the latter category was predominantly made up of specialized publications. If we had used the magazine rates, then the estimated per issue readerships for Ogonyok and Krokodil would have been 4.3 and 3.6 per cent respectively. In other words, it would have made very little difference.

[g]In order to estimate the average per issue readerships of the eleven aggregate republic newspaper media based on the Comcom survey alone, we first computed the unduplicated total readership of all republic papers cited by Comcom respondents (Table 4.9) except Sovietskaya Rossia, the Party-Government organ in the RSFSR. Then, after adjusting this figure by frequency of readership in order to estimate the total per issue readership, we divided the resulting figure between the eleven aggregate republic newspaper media in proportion to their estimated total per issue circulations (Table 4.8). These circulation figures were also used to estimate the average per issue readerships of the aggregate republic newspaper media by the more complex method. We have assumed that only a small error was produced in these estimates by the failure to account for duplicated readership between individual republic newspapers. Because few persons in the Soviet Union were regularly exposed to more than two newspapers (see note e above), and because of the way in which we aggregated republic level newspaper media for the simulation (i.e., Party-Government organs, youth papers, others by periodicity), there probably was very little readership duplication between the individual newspapers which made up the aggregate republic papers. E.g., there were generally two Party-Government organs in a given republic, one in Russian and one in the major nationality language of that republic. Persons residing in the republic read either one or the other, but seldom read both. Also, newspapers published in one republic were seldom read by persons who resided in another republic.

Table 4.10--Continued

[h]In order to estimate the average per issue readerships of the seven aggregate subRepublic newspaper media based on the Comcom survey alone, we first computed the unduplicated total readership of all subRepublic papers cited by Comcom respondents (Table 4.9). Then after adjusting this figure by frequency of readership in order to estimate the total per issue readership, we divided the resulting figure among the seven aggregate subRepublic newspaper media in proportion to their estimated total per issue circulations (Table 4.8). These circulation figures were also used to estimate the average per issue readerships of the aggregate subRepublic newspaper media by the more complex method. For the same reasons outlined in note g, above, we have assumed that only a small error was produced in these estimates by the failure to account for duplicated readership between individual subRepublic newspapers.

estimates derived from Leisure Study interview data alone for central newspapers and magazines substantially exceeds the corresponding total derived from Leisure Study interview data and estimated per issue circulation figures. At the same time, the total of the single-issue readership estimates derived from Leisure Study data alone for sub-Republic newspapers is substantially less than the corresponding total derived from Leisure Study data and circulation figures. Because of the overrepresentation of the educated, urbanites, and males in the Leisure Study sample, this is precisely the way we would have expected totals based solely on readership data from that sample to deviate from the real per issue readership totals for print media published on these two levels. Accordingly, in the simulation we used the set of per issue readership estimates based on the Leisure Study data and the assumed subscription rates and estimated per issue circulation figures for 1963.

Distributing single-issue readerships across cells

Having estimated the size of each simulated print medium's average single-issue readership, we next had to determine how these readerships were distributed across demographic and social strata of the adult Soviet population in 1963. We now proceed to describe how that was done.

Findings of the Leisure Study and other studies

In Chapter I we mentioned the fact that there were, in addition to the Comcom Leisure Study, at least three other important studies with findings that related (in part) to the demographic and social composition of Soviet audiences: the Harvard study of Soviet society, a series of Soviet time budget studies, and a Komsomolskaya pravda poll. With regard to print readership the combined results of these three studies and the findings of the Comcom Leisure Study are in substantial agreement. They may be summarized as follows: By the early 1960's the increased education of the Soviet population since the Second World War had somewhat narrowed the gap in newspaper and magazine consumption between the better educated and the laboring classes (i.e., workers and collective farmers), but it had not eliminated it. Education and occupational standing were still the most powerful determinants of newspaper and magazine consumption, both being positively correlated with exposure. Two other attributes positively correlated with newspaper and magazine consumption were (1) a favorable attitude toward the Communist regime and (2) a willingness to be politically involved. Correlations between sex or age and exposure to print media worked within the educational framework, men having slightly higher exposure than women and the evidence with regard to age being inconsistent. Finally, although the improved distribution of newspapers and magazines over the last quarter century had probably lessened the influence of residence on exposure to both types of media, in the early 1960's exposure to magazines still increased with urbanism.[1]

Problems with the other studies

As the foregoing summary suggests, when taken together the findings of the Harvard study, Soviet time budget studies, a Komsomolskaya pravda poll, and the Comcom Leisure Study provided us with a broad qualitative picture of newspaper and magazine readership in the Soviet Union during the early 1960's. However, for each print medium in the simulation we wished to derive a quantitative estimate of the distribution of the average single-issue readership across demographic and social strata of the Soviet population. Unfortunately, of these four studies only the Comcom Leisure Study contained data in a form which could be used to make such estimates. Among other things, the communications section of the Harvard study focused on the amount of exposure to broadly-defined communications sources, such as "newspapers" and "magazines". But it did not break these sources down into any of the narrower categories by which we had defined the print media in the simulation, i.e., by title, type, administrative level, or periodicity. Moreover, even if the Harvard study had defined communications sources more nearly as we had defined the print media in the simulation, we still could not have used its results to estimate the distributions of their readerships across the Soviet

---

[1]For the data and analysis on which this summary is based the reader is referred to Rogers, "The Soviet Audience," pp. 50-64, in which a number of tabulations from the Comcom survey, the Harvard study, Soviet time budget studies, and the Komsomolskaya pravda poll are reproduced and discussed.

population. Most of the respondents in the Harvard study had left the Soviet Union either during or shortly after the Second World War. As a result, data from this study apply mainly to the pre-War period.

A series of time budget studies undertaken in the Soviet Union since the late 1950's did cover the period in which we were interested, but several difficulties prevented us from using the data from these studies to estimate readership distributions for the various print media in the simulation. The time budget studies did not present data on reading of newspapers and magazines in the kind of detail that could be related to individual newspaper and magazine media in the simulation. They did not even treat these two activities separately. The majority of the studies lumped reading of newspapers, magazines, and books in a single category, and the rest treated reading of either newspapers and magazines or books and magazines as one category. But, here again, even if the time budget studies had defined reading of magazines and newspapers in a way that could have been related to reading of individual print media in the simulation, we still would not have been able to use them to estimate readership distributions for these media. As their name suggests, most of the time budget studies measured newspaper and magazine reading in terms of the time expended on these activities. However, there was no way that we could translate a figure for time spent on reading newspapers (or magazines) into a figure such as "number of newspapers (or magazines) read" or, if the time budget studies had been more detailed, into a figure such as "frequency of exposure to a given newspaper (or magazine)."[1] Further, even if we could have made this translation, and even if the time budget studies had covered reading of the kinds of print media represented in the simulation, there was still another problem which would have prevented us from translating their findings into estimates of readership distributions for these media. The Soviet time budget studies measured only primary activities. Where reading a newspaper or magazine was one of a respondent's secondary activities, it was ignored.[2]

With regard to the use of their data for estimating readership distributions, neither the Komsomolskaya pravda poll nor the Comcom Leisure Study shared the serious drawbacks of the Harvard study or the Soviet time budget studies. Both the poll and the Leisure Study investigated, among other things, reading of newspapers and magazines--not as a single activity but rather as two separate activities, and not in terms of time spent on these activities but rather in terms of frequency of exposure. Also, the facts that (1) the poll results

---

[1]The results of the Comcom survey indicated that the difference in the average time spent by two groups of respondents on reading newspapers on a typical day was not proportional to the difference in the average number of newspapers to which the respondents in these two groups reported exposure (Rogers, "The Soviet Audience," Appendix A, p. 294). The reason for this was that there was a difference in the average time spent by the two groups of respondents on an issue of a newspaper. For the same reason we can presume that, had the tabulation been made, we would have found that the difference in the average time spent by two groups of respondents on reading a given newspaper on a typical day was not proportional to the difference in the average frequency with which respondents in these two groups reported exposure to the particular newspaper.

[2]For a detailed discussion of the difficulties involved in using the findings of the Soviet time budget studies as a supplement to Western studies of Soviet media consumption, the reader is referred to Rogers, "The Soviet Audience," Appendix A, pp. 290-96.

were published in February of 1966 and (2) the median year in which Comcom refugee respondents left the Soviet Union was 1964, suggested that the results of these two studies, unlike the results of the Harvard Project and the Soviet time budget studies, were indeed applicable to the period encompassed by the scenarios we wished to simulate. However, the Komsomolskaya pravda poll did share one characteristic with these other studies which prevented us from making direct use of its results to estimate readership distributions for the various print media in the simulation: it did not break down the newspapers and magazines to which respondents reported exposure into the categories by which we had defined these print media. On the other hand, the Leisure Study interview schedule contained an open-ended question asking respondents to list, by title, the various newspapers and magazines which they read (see p. above). From the answers to this question we were able to identify, and aggregate as necessary, the newspapers and magazines to which Comcom respondents were exposed, in terms of the categories by which we had defined the print media in the simulation.

Applicability of the Leisure Study

For the reasons discussed above, we chose to use the data from the Comcom Leisure Study to estimate the readership distributions for the various print media in the simulation and assess the plausibility of the resulting estimates by comparing them with the broad exposure patterns observed in the findings of the other studies. We turn next to a discussion of how each of the problems associated with the Leisure Study data affected the way in which we estimated these readership distributions.

With regard to frequency of readership, we were prepared to "beg the question" of what percentages of the Leisure Study sample identifying themselves as readers of "every issue," "most issues," and "occasional issues" of a publication should be assigned to the average single-issue readership of that publication. It seemed reasonable to assume that the distribution of a publication's regular readers (those reading every issue or most issues) over the sample would be approximately the same as the distribution of the publication's average single-issue readership over the sample, because occasional readers probably constituted a small fraction of that readership on the average. The problem of bias caused by the overrepresentation of urbanites, the well educated, and males in the sample was solved, for the most part, by weighting the respondents in each cell in such a way as to make the distribution of these traits over the sample exactly match their known distribution over the 1963 adult Soviet population. But this still left two possible sources of bias in the Leisure Study sample, one relating to its size and the other to the nature of the respondents. Because of the small size of the Leisure Study sample, even if the interviews had been conducted with persons living inside the Soviet Union, it would have been by no means certain that the weighted sample members in any population cell were representative of the type of Soviet citizen defined by that cell. In addition, ninety-seven out of the 107 respondents interviewed in the Leisure

Study had left the Soviet Union to live elsewhere, some legally and others illegally. (Ten of the respondents were Soviet visitors to Western Europe.)[1]

We therefore had to consider the implications of the fact that many of the Leisure Study respondents were very likely persons disaffected with Soviet society. This disaffection could easily have been a source of sample bias, because the communications behavior of refugee respondents when they lived in the Soviet Union may not have been representative of the communications behavior of other Soviet citizens. It could also have produced response bias. For example, refugee respondents may have exaggerated the extent of their media exposure (particularly exposure to the print media) to demonstrate the high degree of regimentation in Soviet society, or they may have understated their media exposure to show their indifference to, or mistrust of, the Soviet media. Rogers has analyzed the Leisure Study protocols with an eye toward these considerations. Her findings may be summarized as follows:

---

[1] In order to qualify as a Comcom respondent, each person had to meet the following criteria: he had to have left the Soviet Union not earlier than 1956; he had to have been at least sixteen years old in his last year of residence in the Soviet Union; he had to have lived in the Soviet Union as a citizen or resident for at least 10 years. Seventy-two of the 107 respondents had been born in the Soviet Union and had lived there all their lives, while two more had been born there but had lived outside the country a good part of their lives. Half of those who had not been born in the Soviet Union were less than twenty years old when they entered the country, and all but a handful of those born outside the Soviet Union either had a USSR language as their native language or were young enough when they entered the country (less than ten years of age) to have become functionally bilingual (Rogers, "The Soviet Audience," pp. 16-17).

--The extent to which refugee respondents were persons disaffected with Soviet society or the Communist regime appeared to be less than one might have expected. The reasons for leaving the country cited by respondents in general, whether defectors or emigrés, seldom contained more than a small ideological component. Most respondents reported leaving for personal reasons--for example, at the urging of relatives outside the USSR because their parents or spouses were leaving, out of curiosity, etc.[1]

--On the basis of side conversations between respondents and interviewers, it appeared that all educational and occupational groups in the Leisure Study sample were mixed with regard to attitudes toward the Soviet regime. This suggested that, even if refugee-related attributes did bias the sample as a whole, relationships between subgroups in the Soviet population could still be inferred from relationships between subgroups in the sample.

--The communications behavior of refugee respondents when they lived in the Soviet Union appeared to be more typical of the communications behavior of other Soviet citizens than might have been expected. This conclusion was suggested by the fact that the results of the interviews with defectors and emigrés seemed consistent with the results of the interviews with Soviet visitors to Western Europe.[2]

---

[1] In any event, the design of the Comcom Leisure Study was such that the completed protocols could not be used to measure disaffection with the Soviet system or regime. For example, the questionnaire did not elicit systematic information on events in a respondent's life that could be presumed to have fostered this kind of attitude, such as arrest experience, forced resettlement, lack of access to education because of the respondent's particular ethnic or political background, etc. (Rogers, "The Soviet Audience," pp. 21-22).

[2] Rogers compared the media exposure sections of the defectors' and emigrés' protocols with those of the visitors to Western Europe and found that the general patterns that emerged from the inspection of one set were consistent with those that emerged from the other. For example, when visitors to Western Europe were excluded from the sample, the average number of newspapers and magazines to which respondents in the different educational groups reported regular exposure did not decrease, but actually increased slightly. However, it is important to point out that because of the small numbers involved (e.g., only ten visitors to Western Europe) this general agreement between the two subsamples serves only to help establish

--Because the Leisure Study interview schedule contained only factual questions about a respondent's everyday life, and because the questions about media exposure were interpreted as neutral and nonsensitive questions by refugee and non-refugee respondents alike, the problem of response bias appeared to be negligible in most cases.[1]

In addition to the evidence summarized above, one other factor serves to establish a measure of confidence in the Leisure Study data. In Table 4.11 we present data on the sample members' frequency of regular exposure to newspapers and magazines by education, grouped in such a way as to make it comparable with the results of the Komsomolskaya pravda poll referred to above. Although the poll's results are consistently somewhat higher, it can be seen that there is considerable agreement between the two sources. Because the Komsomolskaya pravda poll was based on a sample of over 13,000 Soviet citizens, and because we had no reason to suspect the reliability of reporting of the poll's results, the close agreement between them

---

a prima facie basis for confidence in the media exposure data from the Leisure Study. Nevertheless, the possibility that the communications behavior of refugee respondents, when they lived in the Soviet Union, was in fact representative of the communications behavior of other Soviet citizens, is also supported by the findings of the Harvard study which indicated that occupation, education and social class are more powerful determinants of media exposure than anti-Soviet sentiment ("The Soviet Audience," pp. 22-24).

[1]A few strongly anti-Soviet respondents expressed their disappointment with the Leisure Study interview because it did not give them a chance to express their feelings about the Soviet Union. On the other hand, those with mixed or favorable attitudes toward the regime, and the Soviet visitors to Western Europe who agreed to take the interview, did not object to any of the questions (Rogers, "The Soviet Audience," p. 23).

and the relatively sparse Comcom Leisure Study data gave us added confidence that the latter source could be used to derive reasonable estimates of readership distributions for the print media in the simulation.[1]

Using the Mosteller technique to construct sample computer readerships

For the purpose of estimating any individual print medium's readership distribution we had available five one-dimensional tables from the Leisure Study, viz., the tables which gave the readership of the medium on each level of each of the five dimensions of the simulation population. Because the Leisure Study was based on a sample, before weighting, of size 107, sampling errors would not have justified our using multi-dimensional readership tables from that source. In weighting to match the 1963 adult Soviet population, many Comcom respondents were counted more than once, so the resulting weighted sample size was 1,075.[2] Dividing this number by the 96

---

[1]Here again we refer to the total print readership rather than to the readership of individual print media.

[2]We did not weight members of the Leisure Study sample by cell, because the sparse nature of the sample would have made this operation meaningless for most cells. In fact, the sample was so sparsely populated that we could not even control for the important education variable in its weighting. We were forced to produce five different weighted samples, each of which was weighted by level on one and only one of the cell-defining dimensions. To estimate the marginal percentage breakdown of any print medium's readership on a given dimension we used the sample that had been weighted on that dimension. The weighted samples are shown below:

population cells gave an average of only 11.2 weighted sample members per cell. Even though individual cell samples varied both well above and well below this average, it should be obvious that we were estimating the sizes of print readerships in many cells from relatively small samples. For each print medium in the simulation the problem was to assign a proportion of the computer individuals in each cell to the average single-issue readership of that medium in such a way that the resulting five-dimensional table, when collapsed appropriately, would reproduce the readership frequencies in each of the one-dimensional tables estimated for that medium from the sparse Leisure Study data. Here again we were faced with one of the kinds

---

	Breakdown of Leisure Study Sample			
Weighted by:	Before Weighting	(%)	After Weighting	(%)
Sex				
Male	75	(70)	451	(42)
Female	32	(30)	624	(58)
Age				
16-29	39	(36)	387	(36)
30-49	47	(44)	398	(37)
50+	21	(20)	290	(27)
Education				
<4 yrs.	0	(0)	366	(34)
≥ 4, <7 yrs.	13	(12)	301	(28)
≥ 7, ≤ 10 yrs.	51	(48)	365	(34)
>10 yrs.	43	(40)	43	(4)
Political Involvement				
Party member	11	(10)	65	(6)
NonParty member	96	(90)	1010	(94)
Residence				
Urban	85	(79)	538	(50)
Rural	22	(21)	537	(50)

of assignment problems for which the application of the Mosteller technique was described in Chapter II (p. , condition). Accordingly, we used this iterative assignment procedure to construct a five-dimensional computer representation of the 1963 adult Soviet readership of each print medium in the simulation from the five one-dimensional tables estimated for that readership from the Leisure Study data. Because we had only these sparse marginal data on the distribution of each print medium's readership, we wished to bias these readership distributions toward the distribution of the 1963 adult Soviet population, on which we had multi-dimensional census data. Accordingly, before using the Mosteller technique to construct each sample computer readership of a print medium, we initialized the cells of the five-dimensional table with the cell sizes in the sample computer population, i.e., with the population values produced by the earlier use of the Mosteller technique. To sum up, then, the estimated marginal distributions of each print medium's readership were biased by the computer population's cell values to produce the cell values for that readership.[1]

---

[1]Of course, using the Mosteller technique this way can result in some cells being assigned readerships larger than their population. This did not happen for any media in the Soviet case, however, because individual media in the simulation had relatively small single-issue readerships. (No individual medium had a single-issue readership greater than fifty per cent of the total population, and most had single-issue readerships considerably smaller than this.)

Plausibility of the resulting readership distributions

Table 4.11 lists the marginal percentage breakdown, on each cell-defining dimension, of that portion of the weighted Leisure Study sample regularly exposed to each print medium in the simulation.[1] For each all-Union print medium in the simulation, the Table also shows the corresponding marginal percentage breakdowns produced by the Mosteller technique in the sample computer readerships. It can be seen that the marginal percentage breakdowns of the simulated print readerships and the corresponding print readerships in the weighted Leisure Study sample are virtually identical on each dimension (A similar result was obtained for the other print media in the simulation). In Table 4.12 we compare the marginal percentage breakdown, on each cell-defining dimension, of the simulation population and the total simulated newspaper readership on each territorial-administrative level. From this comparison it can be seen that males, those between the ages of sixteen and twenty-nine, those with seven or more years of education, and Party members were overrepresented in the total sample computer readership. These patterns, which are even more pronounced in the all-Union readership (where urban residents are also overrepresented), conform to the general findings summarized

---

[1]The Leisure Study sample was too sparsely populated to record a readership figure for some of the print media in the simulation. For the readerships of these media we estimated marginal percentage breakdowns on cell-defining dimensions by extrapolating (or interpolating) the corresponding breakdowns recorded for the readerships of other media. The assumptions made for this purpose are documented in the notes to Table 4.11.

Table 4.11--Marginal percentage breakdowns, on cell-defining dimensions, of the 1963 adult Soviet readership (and the sample computer readership) of each simulated print medium.

Title or Type	Percentage Marginal												
	Male	Female	16-29	30-49	50+	<4	≥4,<7	≥7,≤10	>10	Party Member	NonParty Member	Urban	Rural
All-Union Newspapers													
Pravda	39.4 (39.1)	60.6 (60.9)	42.1 (42.3)	33.1 (33.2)	24.8 (24.5)	16.8 (16.9)	31.1 (31.2)	32.7 (32.9)	19.4 (19.0)	17.4 (17.0)	82.6 (83.0)	67.4 (67.3)	32.6 (32.7)
Izvestia	41.8 (41.8)	58.2 (58.2)	45.0 (45.0)	28.4 (28.3)	26.6 (26.7)	22.4 (22.4)	23.8 (23.8)	43.7 (43.6)	10.1 (10.2)	11.7 (11.8)	88.3 (88.2)	63.7 (63.7)	36.3 (36.3)
Trud[a]	65.0 (65.3)	35.0 (34.7)	40.0 (40.1)	28.0 (27.9)	32.0 (32.0)	35.0 (36.4)	45.0 (43.3)	15.0 (15.2)	5.0 (5.1)	8.0 (8.0)	92.0 (92.0)	68.0 (70.0)	32.0 (30.0)
Komsomolskaya pravda	73.1 (72.9)	26.9 (27.1)	89.0 (89.0)	1.0 (1.0)	10.0 (10.0)	7.3 (7.3)	19.6 (19.9)	53.7 (54.5)	19.4 (18.3)	11.3 (10.1)	88.7 (89.9)	64.6 (63.0)	35.4 (37.0)
Literaturnaya gazeta[a]	28.5 (28.2)	71.5 (71.8)	51.4 (51.6)	24.3 (24.3)	24.3 (24.1)	2.3 (2.1)	12.4 (12.3)	56.7 (56.9)	28.6 (28.7)	8.7 (8.7)	91.3 (91.3)	47.2 (47.2)	52.8 (52.8)
Ekonomicheskaya gazeta[b]	39.4 (38.8)	60.6 (61.2)	42.1 (41.8)	33.1 (33.3)	24.8 (24.9)	16.8 (16.7)	31.1 (30.2)	32.7 (33.5)	19.4 (19.6)	15.0 (15.1)	85.0 (84.9)	67.4 (67.1)	32.6 (32.9)
Selskaya zhizn[a]	68.0 (67.5)	32.0 (32.5)	35.0 (35.6)	30.0 (30.4)	35.0 (34.0)	35.0 (35.0)	45.0 (45.0)	15.0 (15.1)	5.0 (4.9)	6.0 (6.1)	94.0 (93.9)	30.0 (30.0)	70.0 (70.0)

Table 4.11--Continued

Title or Type	Percentage Marginal												
	Male	Female	16-29	30-49	50+	<4	≥4,<7	≥7,≤10	>10	Party Member	NonParty Member	Urban	Rural
All-Union Newspapers and Magazines													
Nedelya[c]	41.8 (41.8)	58.2 (58.2)	45.0 (45.0)	28.4 (28.4)	26.6 (26.6)	22.4 (22.4)	23.8 (23.8)	43.7 (43.6)	10.1 (10.2)	11.7 (11.7)	88.3 (88.3)	63.7 (63.7)	36.3 (36.3)
Krasnaya zvezda[d]	98.0 (98.5)	2.0 (1.5)	20.0 (19.9)	35.0 (34.9)	45.0 (45.2)	5.0 (4.3)	30.0 (30.2)	40.0 (40.2)	25.0 (25.3)	90.0 (90.4)	10.0 (9.6)	45.0 (45.3)	55.0 (54.7)
All Other Papers Published[e] 2 Times a Week	42.2	57.8	52.3	24.7	23.0	3.0	13.6	60.7	22.7	13.1	86.9	61.8	38.2
All Other Papers Published[e] 3 Times a Week	42.2	57.8	52.3	24.7	23.0	3.0	13.6	60.7	22.7	13.1	86.9	61.8	38.2
Ogonyok	40.5 (40.5)	59.5 (59.5)	34.0 (34.0)	28.5 (28.6)	37.5 (39.4)	8.3 (8.2)	46.4 (46.6)	40.6 (40.6)	4.7 (4.6)	1.8 (1.8)	98.2 (98.2)	49.5 (49.6)	50.5 (50.4)
Krokodil	29.0 (29.2)	71.0 (70.8)	6.2 (6.2)	41.1 (41.0)	52.7 (52.8)	4.1 (4.1)	37.6 (37.6)	49.5 (49.6)	8.8 (8.7)	6.5 (6.5)	93.5 (93.5)	55.0 (55.1)	45.0 (44.9)

Table 4.11--Continued

Title or Type	Male	Female	16-29	30-49	50+	Percentage Marginal <4	≥4,<7	≥7,≤10	>10	Party Member	NonParty Member	Urban	Rural
						Republic Newspapers							
Sovietskaya Rossia[f]	56.4 (56.4)	43.6 (43.6)	25.5 (25.5)	47.4 (47.4)	27.1 (27.1)	12.3 (12.3)	30.6 (30.6)	56.2 (56.2)	0.9 (0.9)	2.5 (2.5)	97.5 (97.5)	57.3 (57.3)	42.7 (42.7)
Kazakhstan Party-Govt. Papers[f]	56.8	43.2	28.3	35.3	36.4	19.3	27.6	52.4	.7	2.0	98.0	47.8	52.2
Central Asian Party-Govt. Papers[f]	61.4	38.6	27.4	42.8	29.8	37.8	12.6	49.0	.6	1.4	98.6	36.1	63.9
Transcaucasian Party-Govt. Papers[f]	58.7	41.3	28.4	42.5	29.1	20.6	17.0	61.2	1.2	2.3	97.7	51.2	48.8
Baltic Party-Govt. Papers[f]	57.6	42.4	22.2	43.4	34.4	5.8	38.2	55.1	.9	.9	99.1	51.6	48.4
European Party-Govt.Papers[f]	57.1	42.9	26.9	49.2	23.9	12.3	30.6	56.2	.9	.1	99.9	44.8	55.2

Table 4.11--Continued

Title or Type	Male	Female	16-29	30-49	50+	Percentage Marginal <4	≥4,<7	≥7,≤10	>10	Party Member	NonParty Member	Urban	Rural
Republic Newspapers													
All Komsomol Papers Published 3 Times a Week[g]	60.8	39.2	83.7	1.7	14.6	15.0	25.0	59.8	.2	1.0	99.0	43.3	56.7
All Komsomol Papers Published 5 Times a Week[g]	60.8	39.2	83.7	1.7	14.6	15.0	25.0	59.8	.2	1.0	99.0	43.3	56.7
All Other Papers Published 1 Time a Week[h]	56.4	43.6	25.5	47.4	27.1	12.3	30.6	56.2	.9	2.0	98.0	52.4	47.6
All Other Papers Published 2 Times a Week[h]	56.4	43.6	25.5	47.4	27.1	12.3	30.6	56.2	.9	2.0	98.0	52.4	47.6
All Other Papers Published 3 Times a Week[h]	56.4	43.6	25.5	47.4	27.1	12.3	30.6	56.2	.9	2.0	98.0	52.4	47.6
All Other Papers Published 5 Times a Week[h]	56.4	43.6	25.5	47.4	27.1	12.3	30.6	56.2	.9	2.0	98.0	52.4	47.6

Table 4.11--Continued

Title or Type	Percentage Marginal												
	Male	Female	16-29	30-49	50+	<4	≥4,<7	≥7,≤10	>10	Party Member	NonParty Member	Urban	Rural
Sub-Republic Newspapers													
All Komsomol Papers Published 3 Times a Week[i]	41.2	58.8	85.7	1.6	12.7	15.0	25.0	58.0	2.0	1.7	98.3	33.7	66.3
All Other Papers Published 1 Time a Week[j]	38.2	61.8	33.1	43.4	23.5	18.5	23.1	49.3	9.1	3.5	96.5	40.7	59.3
All Other Papers Published 2 Times a Week[j]	38.2	61.8	33.1	43.4	23.5	18.5	23.1	49.3	9.1	3.5	96.5	40.7	59.3
All Other Papers Published 3 Times a Week[j]	38.2	61.8	33.1	43.4	23.5	18.5	23.1	49.3	9.1	3.5	96.5	40.7	59.3
All Other Papers Published 4 Times a Week[j]	38.2	61.8	33.1	43.4	23.5	18.5	23.1	49.3	9.1	3.5	96.5	40.7	59.3
All Other Papers Published 5 Times a Week[j]	38.2	61.8	33.1	43.4	23.5	18.5	23.1	49.3	9.1	3.5	96.5	40.7	59.3
All Other Papers Published 6 Times a Week[j]	38.2	61.8	33.1	43.4	23.5	18.5	23.1	49.3	9.1	3.5	96.5	40.7	59.3

Table 4.11--Continued

[a]The readership marginals were estimated by assuming values in relation to those computed for Pravda, Izvestia and Komsomolskaya pravda.

[b]Because Eknomicheskaya gazeta is a Government publication and is geared to a specialized audience of scientific, technical, and managerial personnel, we assumed its readership marginals resembled those computed for Pravda, but perhaps with slightly less Party members.

[c]Because Nedelya serves as a supplement to Izvestia we assumed that readership marginals were the same as those estimated for Izvestia.

[d]Because Krasnaya zvezda is an armed forces paper, we assumed that 98 per cent of its readership was male. We further assumed that officers were more likely than enlisted men to read the paper, thereby causing its audience distribution to be skewed toward the older end of the age continuum. We based our estimates of the paper's education and political involvement readership distributions on a note on page eight of Ezhe godnik 1966 (Yearbook of the Great Soviet Encyclopedia for 1966) stating that every fourth Soviet officer has higher military or specialized education and that ninety per cent of all Soviet officers belong to the Party or the komsomol. Finally, considering the composition and deployment of Soviet ground forces, we assumed the readership of Red Star was somewhat more rural than urban.

[e]We estimated the readership distributions for the two "residual" all-Union papers by assuming they were the same as the distribution of the combined readership of all central papers for which a readership count was recorded in the Leisure Study sample.

[f]To estimate the readership distribution for any Republic level Party-Government newspaper medium in the simulation, we biased the distribution of the combined readership of all Republic level papers cited by Comcom respondents by an amount proportional to the difference between the population distributions for the Soviet Union as a whole and the territorial unit encompassed by that Republic level Party-Government paper.

[g]We estimated all but the education marginals for the readership of the two Republic level komsomol papers by assuming that the ratio of a given marginal for each Republic level komsomol paper to the corresponding marginal for Komsomolskaya pravda was the same as the ratio of these two marginals for the combined readerships of all

Table 4.11--Continued

Republic level and all central papers read by Comcom respondents. The education marginals were estimated by assuming plausible values in relation to those computed for Komsomolskaya pravda, all the central papers cited by Comcom respondents, and all the subRepublic papers cited by them as well.

[h]We estimated the readership distributions for the four "residual" Republic level papers by assuming they were the same as the distribution of the combined readership of all Republic level papers for which a readership count was recorded in the Leisure Study sample.

[i]We estimated all but the education marginals for the readership of the subRepublic komsomol paper by assuming that the ratio of a given marginal to the corresponding marginal for Komsomolskaya pravda was the same as the ratio of these two marginals for the combined readerships of all subRepublic and all central papers read by Comcom respondents. The education marginals were estimated by assuming plausible values in relation to those computed for Komsomolskaya pravda, all the central papers cited by Comcom respondents, and all the subRepublic papers cited by them as well.

[j]We estimated the readership distributions for the six "residual" subRepublic papers by assuming they were the same as the distribution of the combined readership of all subRepublic papers for which a readership count was recorded in the Leisure Study sample.

Table 4.12--Marginal percentage breakdowns, on cell-defining dimensions, of the simulation population and of the total simulated newspaper readership on each territorial-administrative level.

Dimension	Simulation Population (N=1,200)	Total Simulated Newspaper Readership All-Union (N=617)	Republic (N=306)	SubRepublic (N=653)	Total (N=1,576)
Sex					
Male	42	51	58	39	47
Female	58	49	42	61	53
Age					
16-29	36	51	34	39	43
30-49	37	25	40	38	33
50+	27	24	26	23	24
Education					
<4 yrs.	34	17	15	18	17
≥4,<7 yrs.	28	27	28	23	25
≥7,≤10 yrs.	34	40	56	50	48
>10 yrs.	4	16	1	9	10
Political Involvement					
Party Member	6	15	1	3	8
NonParty Member	94	85	99	97	92
Residence					
Urban	50	60	49	40	49
Rural	50	40	51	60	51

in Chapter I and at the beginning of this section. They therefore testify to the plausibility of the readership distributions mapped into computer storage from the weighted Leisure Study sample.

Soviet Radio and Television Audiences

Defining individual Soviet electronic media

In 1963 there were 716 different radio stations and television centers in the Soviet Union, with domestic broadcasts originating both on the central and regional levels. Table 4.13 shows the number of major radio and TV stations and the total programming hours per day for central and regional broadcasts. Radio was far ahead of television in terms both of number of major stations and total broadcast time.

Table 4.13 also indicates that, like the Russian press, Soviet electronic media had a vertical structure. Domestic radio programs originated on four territorial-administrative levels: all-Union or central radio; Republic level radio (aimed at the population of the entire republic)[1]; radio broadcasting below the Republic level (in autonomous republics, autonomous *oblasts*, and individual *krays* and *oblasts* within the republic); and the radio-diffusion exchanges. The latter supplied systems of

---

[1] The RSFSR was an exception. See Chapter V, p.

Table 4.13--Soviet radio and television broadcasting, in 1963, by territorial-administrative level, number of stations and total daily programming time.

Territorial-Administrative Level	Number of Stations or Centers	Total Daily Programming Hours[c]
RADIO		
Central	-	76.0
Regional	-	653.0
Totals	256[a]	729.0
TELEVISION		
Central	-	19.3
Regional	-	373.3
Totals	150[b]	392.6
Grand Totals	406	1,121.6

[a]Taken from: Durham, "Radio and Television," Table I.E, p. 101. Approximately half of these radio stations were located in the RSFSR.

[b]Taken from: Rogers, "The Soviet Audience," Table III.1, p. 80. This figure includes TV centers and the most important relay stations. In addition, there were another 310 relay stations of minor significance.

[c]Estimated from: Rogers, "The Soviet Audience," Table III.2, p. 81, by interpolating the 1959 and (planned) 1965 figures.

wired radio with broadcasts from the central and regional levels, but were set up so that they could also add broadcasts of their own. Television broadcasts emanated from Moscow (Central Television) and from the capitals of the Union republics and other kray and oblast centers. In the case of both radio and television, central broadcasts were not only a model for local broadcasts, but made up part of the local broadcasts as well. For example, in the first half of 1966 central broadcasts were relayed to the capitals of twelve union republics and close to one hundred other large towns.[1]

These characteristics reflect the important role played by central radio and television broadcasts, a role which we discussed in Chapter I. The dependence of regional on central broadcasts, with respect to program schedules and program content, had an important bearing on the way we conceptualized individual electronic media for the simulation.

The obvious strategy, somewhat analogous to the definition of each newspaper as a print medium, would have been to define each television or radio station as an electronic medium.[2] However, there were several reasons why this could not be done. First, the simulation programs can process a maximum of only sixty-four

---

[1]The amount of regional broadcasting varied with the size of the republic. In 1963 the largest amount of regional broadcasting took place within the RSFSR, which had approximately half the radio stations and, in 1959, nearly two-thirds of the television stations in the USSR (Rogers, "The Soviet Audience," p. 84).

[2]One difference between these two approaches stems from the fact that newspapers have several editions.

communications media and their audiences, but as we have seen, in 1963 there were over 700 radio and television stations in the Soviet Union. Second, even if we had consolidated all the radio and TV stations in a reasonably small number of station "groups", and defined each group as an individual medium, two serious problems would still have remained.

In the Comcom sample, the amount of radio listening and television viewing varied greatly over a day, reaching peaks in the "early morning" (5:30-8:29 a.m.), at "lunch time" (noon-2:59 p.m.), and during "late afternoon-evening" (6:00-9:29 p.m.) for radio, and "in the evening" (6:00-11:59 p.m.) for television. Moreover, the composition of the listening audience varied as well; women were a much greater proportion of the audience in the "midmorning" (8:30-11:59 a.m.) and "afternoon" (3:00-5:59 p.m.) than at other times of the day. It would have been impossible to simulate the effects of these shifting radio and television audiences if we had defined individual media in terms of stations or groups of stations and treated newscasts (or items in newscasts) as separate messages in these media.

The other difficulty in defining stations as electronic media was related to the problem of duplication. In Chapter II we described how the largest part of the duplication between the audiences of two media is accounted for, in the simulation, by cell means. We also showed that the simulation could only make small modifications to an audience duplication which was random at the cell level but which did not match the estimated empirical duplication. If we had used stations as media, it would have been impossible both to simulate duplications that were random (or nearly random) at the cell level, between pairs of messages occurring over two stations at different times, and to simulate zero duplications between other pairs of messages occurring over these two stations at the same (or nearly the same) time.

For these reasons it was more appropriate to define individual radio and TV media in terms of periods of the day. It seemed reasonable to assume that, for a given time of day, the audience total over all stations would have remained roughly the same, both in size and composition, from one day to the next.[1] We treated given times of day as single "issues" of radio or TV media defined in terms of those time slots, and we treated the various newscasts (or items in the newscasts) occurring during those periods as messages in the media.

Comcom Leisure Study data on radio listening, summarized in Table 4.15, showed three times of peak listening, each followed by a period of much lighter listening. The pattern observed for tele-

---

[1] We would have preferred to restrict this assumption to a given day of the week, but Comcom listening and viewing data were not broken down that way.

Table 4.15--Times of day at which Comcom respondents reported listening to Soviet radio and viewing Soviet television.[a]

Time of Day	Number of Respondents Who Attended[b]	
Radio		
Early morning (5:30-8:29 a.m.)	69	
Midmorning (8:30-11:59 a.m.)	18	
Lunchtime (noon-2:59 p.m.)	50	
Afternoon (3:00-5:59 p.m.)	18	
Early evening (6:00-9:29 p.m.)	62	
Late evening (9:30 p.m.-5:29 a.m.)	15	
Television		
In the afternoon (hour unspecified or before 5:00 p.m.)	6	
In the evening	54	
(between 5:00 and 6:00 p.m.)		5
(hour unspecified or from 6:00 p.m. on)		49
No answer	5	

[a]Taken from: Rogers, "The Soviet Audience," pp. 114 and 115.

[b]For radio N=99; for television N=59.

vision viewing, also summarized in Table 4.15, was quite different. TV viewing typically occurred in the evening, after 6:00 p.m. The few respondents who reported any exposure during the day all mentioned the evening as their typical viewing time.[1]

It seemed reasonable to assume that (1) the daily distributions of listeners over time slots were roughly similar for radio and TV stations on all territorial-administrative levels, and (2) the composition of the radio and TV audiences shifted between heavy and light listening and viewing periods. Accordingly, the figures in Table 4.15 suggested that, for the purpose of defining individual domestic electronic media, we divide the Soviet listening day into six time slots--5:30-8:29 a.m., 8:30-11:59 a.m., noon-2:59 p.m., 3:00-5:59 p.m., 6:00-9:29 p.m., and 9:30 p.m.-5:29 a.m.; and that we divide the Soviet viewing day into two time slots--11:00 a.m.-5:59 p.m. and 6:00 p.m. on.

We defined ten Soviet radio media and four Soviet television

---

[1] These figures largely reflect television programming times. For example, in 1963 the Moscow station, which carried the heaviest program load, offered a daily hour-long show at noon, and programming again from about five to eleven p.m. Sunday programs ran without interruption from noon to midnight ("35 Million Watch Soviet Television," The New York Times, May 19, 1963, p. 9). However, the viewing figures also reflect the fact that television was much less accessible than radio in the work environment.

media in the simulation, distinguishing central from regional broadcast in different time slots.

Table 4.16 lists the time of day and types of broadcasts used to define each Soviet electronic medium in the simulation.

Estimating the sizes of daily audiences

In the simulation model we treated all broadcasts during a given part of a day as constituting the analogy to an "issue" of a print medium, and we treated the average number of persons who listened or viewed at all during that time of day as the average "single-issue" audience of that electronic medium. We now proceed to describe how the magnitude of this audience figure was estimated for each of the fourteen Soviet domestic electronic media conceptualized in the simulation.

The method used to estimate radio and TV audiences was determined by the kind of data we had available. In Western media systems ratings of the actual audience of a particular radio

Table 4.16--Soviet electronic media in the simulation, by title, time of day, and types of broadcasts.

Medium	Time of Day	Types of Broadcasts
	Radio	
Early morning central	5:30-8:29 a.m.	Central only
Lunchtime central	noon-2:59 p.m.	Central only
Early evening central	6:00-9:29 p.m.	Central only
Late evening central	9:30 p.m.-5:29 a.m.	Central only
Early morning regional	5:30-8:29 a.m.	Regional only
Lunchtime regional	noon-2:59 p.m.	Regional only
Early evening regional	6:00-9:29 p.m.	Regional only
Late evening regional	9:30 p.m.-5:29 a.m.	Regional only
Midmorning	8:30-11:59 a.m.	Central and regional
Afternoon	3:00-5:59 p.m.	Central and regional
	Television	
Daytime central	11:00 a.m.-5:59 p.m.	Central only
Nighttime central	6:00 p.m.-10:59 a.m.	Central only
Daytime regional	11:00 a.m.-5:59 p.m.	Regional only
Nighttime regional	6:00 p.m.-10:59 a.m.	Regional only

or television program, are widely distributed. They generally represent average percentages of the sampled homes in a given area that have their radio or television set tuned to the given program. By projecting these ratings to all households in the population of interest, assuming that in every household only one radio or TV set is playing at a given time, and using listener or viewer "densities," i.e., numbers of adult males and females listening or viewing per set playing (also projected from sampled homes), the average audiences of given radio and TV programs can be estimated.[1]

The Soviets, however, report no ratings. We had two different types of relevant data for Soviet electronic media. First, we knew what percentages of the Comcom survey sample listened to radio or watched television at various times of the day. This information was in answers to the following questions: "About how many minutes, if at all, would a radio set be on where you could hear it?" "About how many minutes, if at all, would a television set be on where you could hear it? (At what time of day?)" Comcom respondents answered the radio question for each of seven time

---

[1] In Western countries additional data is available which allows one to take account of the substantial radio listening and TV viewing outside of the home, as, for example, while commuting in cars or while visiting (see, e.g., Kramer, "A Computer Simulation," Chapter IV).

slots: "early morning", "midmorning", "lunch", "early afternoon", late afternoon", "evening", "late night". They answered the TV question either for specific times of day or for each of two time slots: "afternoon", "evening". Table 4.17 summarizes the raw listening and viewing data for each Soviet electronic medium defined in the simulation.

The second type of data we had were estimated of the maximum potential audiences for Soviet domestic radio and TV. The Chairman of the State Committee on Radio and Television put the size of the Soviet radio audience at 150,000,000 out of a total Soviet population of about 224 million in 1963.[1] Various estimates of the size of the Soviet television audience have also been published. According to a former Chairman of the State Committee on Radio and Television, the TV audience in 1963 numbered between 35 and 40 million persons.[2]

Table 4.18 lists two different estimates of the average audience of each Soviet electronic medium in the simulation. One set of estimates is based on listening and viewing data from the weighted Leisure Study sample, i.e., on Comcom respondents' answers to questions about their daily consumption of radio and TV.[3] The

---

[1] Durham, Radio and Television, p. 74, quoting Kharlamov.

[2] Ibid.

[3] For these estimates we used the Leisure Study sample weighted to match the education breakdown of the adult 1963 Soviet population. In the case of central radio and television media, we divided the weighted audience estimate by the number of respondents who "knew some Russian" and multiplied the result by the corresponding (estimated)

Table 4.17--Times of day at which Comcom respondents reported being able to listen to central and regional Soviet radio and view central and regional Soviet television.

Medium	Percentage of the Leisure Study Sample That Could Attend
Radio	
Early morning central (5:30-8:29 a.m.)	27.1*
Lunchtime central (noon-2:59 p.m.)	34.6
Early evening central (6:00-9:29 p.m.)	45.8
Late evening central (9:30 p.m.-5:29 a.m.)	17.8
Early morning regional (5:30-8:29 a.m.)	43.0
Lunchtime regional (noon-2:59 p.m.)	14.0
Early evening regional (6:00-9:29 p.m.)	20.6
Late evening regional (9:30 p.m.-5:29 a.m.)	8.4
Midmorning (8:30-11:59 a.m.)	3.7
Afternoon (3:00-5:59 p.m.)	8.4
Television	
Daytime central (11:00 a.m.-5:59 p.m.)	6.5*
Nighttime central (6:00 p.m.-midnight)	24.3
Daytime regional (11:00 a.m.-5:59 p.m.)	6.5
Nighttime regional (6:00 p.m.-midnight)	30.8

*N=107.

Table 4.18--The average audience of each Soviet electronic medium in the simulation, estimated two ways.[a]

Medium	Average Single-Issue Audience: Based on Comcom Leisure Study	Average Single-Issue Audience: Based on Maximum Audience Estimates and Comcom Leisure Study
Radio		
Early morning central (5:30-8:29 a.m.)	19.3%	12.7%
Lunchtime central (noon-2:59 p.m.)	32.2	21.1
Early evening central (6:00-9:29 p.m.)	34.3	22.5
Late evening central (9:30 p.m.-5:29 a.m.)	13.9	9.1
Early morning regional (5:30-8:29 a.m.)	51.2	33.6
Lunchtime regional (noon-2:59 p.m.)	8.5	6.6
Early evening regional (6:00-9:29 p.m.)	17.5	11.5
Late evening regional (9:30 p.m.-5:29 a.m.)	8.1	5.3
Midmorning (8:30-11:59 a.m.)	2.6[b]	1.7
Afternoon (3:00-5:59 p.m.)	5.8[b]	3.8
Television		
Daytime central (11:00 a.m.-5:59 p.m.)	2.6	1.2
Nighttime central (6:00 p.m.-midnight)	15.7	7.1
Daytime regional (11:00 a.m.-5:59 p.m.)	1.9[c]	0.9
Nighttime regional (6:00 p.m.-midnight)	26.3[c]	11.9

Table 4.18--Continued

[a]Estimates represent percentages of the 1962-63 adult Soviet population.

[b]Because the number of Comcom respondents who reported listening to either midmorning or afternoon radio was so small, we used the total for the media as a base for estimating the size of their combined average audience and derived the audience for each as a fraction of the resulting estimate.

[c]The number of Comcom respondents who reported watching either daytime central television or daytime regional television was too small to use as a base for reliably estimating the size of each medium's average audience. As a result, we derived these audience sizes by assuming that both they and the combined audience estimate for midmorning and afternoon radio were directly proportional to the corresponding audience count obtained from the Leisure Study sample.

other set of estimates incorporates the approximate sizes of the maximum potential audiences for radio and TV in 1963. It was computed by assuming that the largest audience derived from the Leisure Study data for a given time also represented, for radio, half of all potential listeners, and, for television, two thirds-of all potential viewers, ratings not unlike those at peak hours in the United States. Audiences were then distributed across the other time slots to match the distribution derived from the Leisure Study.

The first procedure produces estimates significantly larger than the second. There are several possible reasons for this. The Leisure Study estimates are based on a group of respondents who are, on the average, of higher education and status than the median of the Soviet population. Furthermore, they were answering regarding the times of day a radio or TV set would normally be playing where they could hear it. However, they may not have answered in terms of every day, but rather in terms of most days. This would tend to make the resulting audience estimates somewhat high. It is difficult to know whether or not published estimates of the sizes of the Soviet radio and TV audiences accurately reflect the total number of persons who had access to collective radio listening and the even greater incidence of collective television viewing in the Soviet Union during the early 1960's.

---

percentage of the 1963 Soviet population. For the other radio and TV media we simply took the weighted audience estimate, as a percentage of the total sample.

Since we were unable to ascertain the basis for the total audience sizes on which the second set of estimates rests, we used in the simulation the radio and TV audience estimates derived from the Comcom Leisure Study listening and viewing data.[1]

Distributing daily audiences across cells

Having estimated the size of each simulated Soviet electronic medium's average audience, we next had to determine how these audiences were distributed across demographic and social strata of the adult Soviet population in 1963. We now proceed to describe how that was done.

Findings of the Leisure Study and other studies

With regard to radio listening and TV viewing the results of the Harvard study, Soviet time budget studies, the Komsomolskaya

---

[1]A third type of data we had available, which also related to the size of Soviet radio and TV audiences, was the number of sets in use during 1963. The figures are as follows: 33 million wired sets, 32 million wave sets, and 8 million television sets (Durham, Radio and Television, Appendix IA, p. 96). Unfortunately, we had no reliable information on listening and viewing densities (average number of listeners and viewers per set) which could be used to convert these set estimates to audience estimates. It is interesting to note, however, that if we assume half the radio sets and two-thirds of the television sets were turned on during the peak listening and viewing periods, and if we further assume average attendance densities of 2.0 adults per radio set and 5.0 adults per TV set, we obtain audience estimates which fall about halfway between those shown in Table 4.18. We speculate that an estimation procedure based on these assumptions might have provided a more reasonable set of audience figures for Soviet radio and TV than the ones that were actually used in the simulation.

pravda poll, and the Comcom Leisure Study are, once again, in substantial agreement. They may be summarized as follows: By the early 1960's frequency of exposure to Soviet radio had become about the same in all educational groups. Frequency of exposure to television still increased with education and occupational standing, but the pattern was changing. With the continued expansion of the distribution and reception networks, TV exposure patterns were beginning to approach those observed for radio. The spread of electrification to the countryside had all but eliminated the radio consumption gap between urbanites and residents of rural areas, but access and exposure to TV still increased somewhat with urbanism. As in the case of Soviet print media, pro-Communist attitudes and a willingness for political involvement were positively correlated with radio and TV consumption, while sex and age differences were slight and worked within the educational and occupational frameworks.[1]

Table 4.19 shows Comcom respondents' frequency of exposure to television by education, with the Leisure Study data grouped in such a way as to make it comparable with the results of the Komsomolskaya pravda poll.[2] The close correspondence between these two sets of

---

[1] For the data and analysis on which this summary is based, the reader is referred to Rogers, "The Soviet Audience," pp. 109-113, in which a number of tabulations from the Comcom survey and the Komsomolskaya pravda poll are reproduced and discussed.

[2] We were unable to make a similar comparison for radio because Comcom respondents were not asked about the frequency of their radio listening over an extended period of time--e.g., whether they listened daily, several times per week, or less. In fact, Comcom respondents were not asked about the frequency of their television viewing either, but in this case Rogers was able to reconstruct the breakdown from their comments ("The Soviet Audience, p. 109).

Table 4.19--Frequency of exposure to television, by education, in the Leisure Study sample and the *Komsomolskaya pravda* poll.[a]

Education	Watched at Least Several Times a Week		Watched at Least Several Times a Month		
	Comcom	*Komsomolskaya pravda*	Comcom	*Komsomolskaya pravda*	Comcom (N=96)[b]
Higher (>10 yrs.)	35%	46%	56%	55%	(34)
Secondary (=10 yrs.)	39	39	48	49	(31)
Less than Secondary (<10 yrs.)	32	32	35	37	(31)

[a]Taken from: Rogers, "The Soviet Audience," p. 110.

[b]Party members are excluded from the breakdown because of their extremely uneven distribution over the three educational groups.

results, together with the considerations reviewed in the first part of this chapter, serve to establish a measure of confidence in the Leisure Study data on radio and TV consumption. Accordingly, we used the Leisure Study data to estimate audience distributions for the Soviet electronic media in the simulation.

Using the Mosteller technique to construct sample computer audiences

For the purpose of estimating the distribution of any individual Soviet radio or television medium's audience we had available, as in the case of print media, five one-dimensional tables from the Leisure Study which gave an estimate of the audience of the medium on each dimension of the simulation population. Faced once again with the kind of assignment problem described in Chapter II, we used the Mosteller technique to construct a five-dimensional computer representation of the 1963 adult Soviet audience of each Soviet radio or TV medium in the simulation from the five one-dimensional tables derived for that audience from the Leisure Study data. Having only these sparse marginal data on each electronic medium's audience, we again biased each Mostellerized audience distribution toward the more firmly established 1963 population distribution by initializing the cells of each five-dimensional table with the sample computer population's cell values.

Plausibility of the resulting listenership and viewership distributions

Table 4.20 shows the marginal percentage breakdown, on each cell-defining dimension, produced by the Mosteller technique in the sample computer readerships for the Soviet electronic media in the simulation. For every medium we obtained the same type of result that was illustrated in Table 4.11 above: Simulated audience marginals were virtually identical with the corresponding marginals in the weighted Leisure Study sample, thus providing further evidence of the satisfactory functioning of the Mosteller technique.

Table 4.21 compares the marginal percentage breakdown, on each cell-defining dimension, of the simulation population and the total simulated Soviet radio and television audiences, on both the central and regional levels. We note in the case of domestic radio that females, persons fifty or more years of age, persons with less than seven years of education, nonParty members, and urbanites were all, in varying degrees, overrepresented in the total sample computer audience. A similar pattern prevailed on the central level, and on the regional level as well, with but two exceptions: Persons having seven to ten years of education and rural inhabitants were over-represented in the simulated audience of regional radio. Females, nonParty members, and urbanites were also overrepresented in the sample computer audience of Soviet television (escept for Party members on the central level), but in this case it was the youngest age group and the two middle education groups that were overrepresented.

Table 4.20--Marginal percentage breakdowns, on cell-defining dimensions, of the sample computer audience of each simulated Soviet electronic medium

Medium	Male	Female	16-29	30-49	50+	<4	≥4,<7	≥7,≤10	>10	Party	Non Party	Urban	Rural
	PERCENTAGE MARGINAL												
Radio													
Early morning central (5:30-8:29 a.m.)	27.0	73.0	44.6	24.0	31.4	33.1	30.6	32.3	4.0	8.0	92.0	61.6	38.4
Lunchtime central (noon-2:59 p.m.)	54.0	46.0	22.1	39.5	38.4	33.2	30.8	34.1	1.9	3.6	96.4	50.9	49.1
Early evening central (6:00-9:29 p.m.)	36.2	63.8	39.2	26.4	34.4	31.2	28.9	36.6	3.3	5.6	94.4	56.5	43.5
Late evening central (9:30 p.m.-5:29 a.m.)	28.0	72.0	39.5	32.6	27.9	30.8	28.6	37.7	2.9	2.3	97.7	36.3	63.7
Early morning regional (5:30-8:29 a.m.)	44.1	55.9	24.9	39.8	35.3	33.8	29.5	34.7	2.0	1.3	98.7	42.8	57.2
Lunchtime regional (noon-2:59 p.m.)	31.7	68.3	33.7	47.2	19.1	20.3	25.3	46.2	8.2	4.2	95.8	42.0	58.0
Early evening regional (6:00-9:29 p.m.)	30.9	69.1	49.5	31.4	19.1	29.6	24.6	41.3	4.5	3.4	96.6	54.3	45.7
Late evening regional (9:30 p.m.-5:29 a.m.)	19.9	80.1	40.0	17.4	42.6	42.5	19.5	32.5	5.5	7.9	92.1	48.1	51.9
Midmorning (8:30-11:59 a.m.)[a]	16.1	83.9	45.4	33.1	21.5	20.6	25.8	47.1	6.5	4.8	95.2	76.1	23.9
Afternoon (3:00-5:59 p.m.)[a]	16.1	83.9	45.4	33.1	21.5	20.6	25.8	47.1	6.5	4.8	95.2	76.1	23.9
Television													
Daytime central (11:00 a.m.-5:59 p.m.)[b]	16.1	83.9	45.4	33.1	21.5	20.6	25.8	47.1	6.5	4.8	95.2	76.1	23.9
Nighttime central (6:00 p.m.-midnight)	23.8	76.2	40.7	38.4	20.9	27.2	37.9	30.0	4.9	9.1	90.9	80.0	20.0
Daytime regional (11:00 a.m.-5:59 p.m.)[b]	16.1	83.9	45.4	33.1	21.5	20.6	25.8	47.1	6.5	4.8	95.2	76.1	23.9
Nighttime regional (6:00 p.m.-midnight)	29.6	70.4	45.6	37.2	17.2	26.3	24.5	45.2	4.0	1.9	98.1	65.7	34.3

Table 4.20--Continued

[a] Because the number of Comcom respondents who reported listening to either midmorning or afternoon radio was so small, we used the combined total for both media as a base for estimating the distribution of their average audiences, assuming that this distribution was about the same for each medium.

[b] The number of Comcom respondents who reported watching either daytime central television or daytime regional television was too small to use as a base for reliably estimating the audience distributions for these two media. As a result, we estimated these distributions by assuming they were about the same as for midmorning and afternoon radio.

Table 4.21--Marginal percentage breakdowns, on cell-defining dimensions, of the simulation population and the total simulated radio and television audiences on the central and regional levels.

Dimension		Total Simulated Audience		
Level	Simulation Population (N=1,200)	Central (N=1,298)	Regional (N=1,025)	Total (N=2,323)
		Radio		
Sex				
Male	42	37	38	37
Female	58	63	62	63
Age				
16-29	36	36	32	34
30-49	37	31	37	33
50+	27	33	31	33
Education				
<4 yrs.	34	41	33	37
≥4,<7 yrs.	28	30	27	29
≥7,≤10 yrs.	34	26	37	31
>10 yrs.	4	3	3	3
Political Involvement				
Party Member	6	5	3	4
NonParty Member	94	95	97	96
Residence				
Urban	50	55	46	51
Rural	50	45	54	49

Table 4.21--Continued

Dimension Level	Simulation Population (N=1,200)	Total Simulated Audience Central (N=1,298)	Regional (N=1,025)	Total (N=2,323)
		Television		
Sex				
Male	42	23	29	26
Female	58	77	71	74
Age				
16-29	36	41	46	44
30-49	37	38	37	37
50+	27	21	17	19
Education				
<4 yrs.	34	26	26	26
≥4,<7 yrs.	28	36	25	29
≥7,≤10 yrs.	34	33	45	41
>10 yrs.	4	5	4	4
Political Involvement				
Party Member	6	8	2	4
NonParty Member	94	92	98	96
Residence				
Urban	50	79	66	72
Rural	50	21	34	28

Also, the simulated audiences of Soviet TV contained significantly more females and urbanites than the domestic radio audience.

These patterns are largely the ones described in Chapter I and summarized at the beginning of this section. As such, they attest to the reasonableness of the electronic audience distributions mapped into computer storage from the weighted Leisure Study sample.

The Soviet Audience For Foreign Radio

Defining individual foreign radio media

By 1963 broadcasts from at least nineteen different foreign radio stations were reaching the Soviet population. Radio Liberty led by far in terms of daily programming hours (24), followed by Voice of America (7) and the British Broadcasting Corporation (3). VOA transmissions were in Russian and in three of the basic nationality languages. The BBC was broadcasting in Russian, and Radio Liberty was transmitting material in seventeen languages of the USSR, to eight different target areas, covering by far the largest amount of territory. Other foreign broadcasters included Deutsche Welle (1 1/2 hours daily), Voice of Canada (1 hour), French Radio (1 hour) and stations located in the Vatican, Peking, Tokyo, Ceylon, Tangiers, Madrid, Monte Carlo, Athens, Rome, Warsaw, Luxembourg, the Netherlands, and East Germany.[1] Most foreign stations concentrated the bulk of

---

[1] This list was compiled from the foreign radio stations to which Comcom Leisure Study respondents reported listening.

their broadcasts during the evening and early morning hours.

With the discontinuation of Soviet jamming of VOA and the BBC in June of 1963, Radio Liberty remained as the only important Western broadcaster still jammed. During this period at least one in every three adult Russians had access to a radio set which could receive foreign programs[1] and, in the view of Radio Liberty's director of audience research, Soviet daily listeners to foreign radio ranged as high as 15 to 25 million persons.[2] Thus, by the early 1960's foreign radio had become an important source of information about the outside world for a significant element of the Soviet population. We can assume that this was especially true during periods of international crisis.

For the same reasons outlined in the previous section, we chose to define individual foreign radio media in terms of daily time slots, treating the various foreign newscasts (or items in these newscasts) transmitted during a given part of the day as messages in a given discrete foreign radio medium.

Comcom Leisure Study data on foreign radio listening were too sparse to yield a reliable estimate of the distribution of listeners over various times of the day. However, more ample data was available for the Radio Liberty Audience. Table 4.22 shows an estimate developed

---

[1] Pool, "Opportunities for Change," p. 6.

[2] Max Ralis, Comcom Soviet Memorandum No. 3, p. 4.

Table 4.22--Most favored Radio Liberty listening times, January 1, 1962 to January 31, 1964.*

Time of Day	Per Cent of Listeners
Early morning (4:00-7:59 a.m.)	8
Midmorning (8:00-11:59 a.m.)	1
Afternoon (Noon-3:59 p.m.)	2
Early evening (4:00-7:59 p.m.)	28
Evening (8:00-11:59 p.m.)	39
Late evening (Midnight-3:59 a.m.)	22

*Adapted from: Max Ralis, Comcom Soviet Memorandum No. 6. Figures, which are based on letters received by Radio Liberty from several hundred of their Soviet listeners, represent the percentages whose most favored listening times were as indicated. However, the figures probably represent a fairly good estimate of the station's total listener distribution over these times of day as well.

by Radio Liberty's audience research division, of the station's daily listener distribution during the period 1962-64. We note that listening typically occurred in the evening and very early morning hours. It seemed reasonable to assume that (1) the daily distributions of listeners over time slots were roughly similar for the three major foreign radio stations, and (2) the composition of the daytime foreign radio audience was somewhat different from that of the evening audience. Accordingly, the data shown in Table 4.22 suggested that we divide the Soviet day into at least two time periods.

We therefore defined nine foreign radio media in the simulation. Three of the media carried Voice of America broadcasts and encompassed the following three time slots: 4:00-7:59 a.m.; 8:00 a.m.-7:59 p.m.; 8:00 p.m.-3:59 a.m. Another three carried BBC broadcasts and the third three Radio Liberty broadcasts in the same three time slots. Table 4.23 lists the station and time of day used to define each foreign radio medium in the simulation.

---

[1] *Ibid*.

Table 4.23--Foreign radio media in the simulation, by title and time of day.

Medium	Time of Day
Early morning Voice of America	4:00-7:59 a.m.
Daytime Voice of America	8:00 a.m.-7:59 p.m.
Nighttime Voice of America	8:00 p.m.-3:59 a.m.
Early morning British Broadcasting Corporation	4:00-7:59 a.m.
Daytime British Broadcasting Corporation	8:00 a.m.-7:59 p.m.
Nighttime British Broadcasting Corporation	8:00 p.m.-3:59 a.m.
Early morning Radio Liberty	4:00-7:59 a.m.
Daytime Radio Liberty	8:00 a.m.-7:59 p.m.
Nighttime Radio Liberty	8:00 p.m.-3:59 a.m.

Estimating the sizes of daily audiences

As with Soviet domestic radio and TV, we had no program rating data on listening to foreign radio broadcasts beamed to the USSR. We did, however, have two different types of pertinent information--one for VOA, the BBC, and Radio Liberty, and the other for foreign radio as a whole. First, we knew what foreign radio stations Comcom respondents listened to most often, and what percentage of the Leisure Study sample listened to each of these stations. This information was based on the answers to the following question from the Leisure Study interview: "Which [foreign radio station] did you listen to most often?" Table 4.24 summarizes the raw listening data on each foreign radio station represented in the simulation.

The second piece of information we had was an estimate of the average size of the total daily audience for foreign radio as a whole. According to Radio Liberty's Director of Audience Research, in 1963 a plausible range for this figure was between 15 and 25 million persons.[1]

---

[1] Max Ralis, Comcom Soviet Memorandum No. 3, p. 4. Ralis also estimated the ranking of the top three foreign stations to be VOA, the BBC, and Radio Liberty, an estimate which coincided with the Leisure Study findings (Comcom Soviet Memorandum No. 6).

Table 4.24--Foreign radio stations to which Comcom respondents listened most often.

Station	Percentage of the Leisure Study Sample That Listened
Voice of America	43.0*
British Broadcasting Corporation	29.0
Radio Liberty	15.9

*N=107.

Table 4.25 lists two different estimates of the average audience of each foreign radio medium in the simulation. One set of estimates is based on listening data from the weighted Leisure Study sample--i.e., on Comcom respondents' answers to questions about their consumption of foreign radio broadcasts--and on the estimated daily distribution of Radio Liberty listeners over time slots (Table 4.22).[1] The other set of estimates incorporates the average size of the total daily audience for foreign radio in 1963 (which we have assumed to be 20 million persons). This set of estimates was computed by assuming that the largest audience for a given station and time slot, as derived from the Leisure Study and Radio Liberty data, included virtually all of the persons who listened in the course of an average day. Audiences were then distributed over the other station-time slot combinations to match the distribution derived from the Leisure Study and Radio Liberty data.

The first set of estimates is somewhat larger than the second. As in the case of domestic radio and TV, there are at least two possible reasons for this. The Leisure Study/Radio Liberty estimates are based on Comcom respondents' answers regarding the foreign radio stations to which they listened most frequently. We weighted each respondent's answers by his frequency of foreign radio listening.

---

[1]For these estimates we used the Leisure Study sample weighted to match the education breakdown of the adult 1963 Soviet population. For each station we allocated the estimated daily audience to the three time slots in such a way as to match the distribution derived from Radio Liberty data.

Table 4.25--The average daily audience of each foreign radio medium in the simulation, estimated two ways.*

Medium	Average Single-Issue Audience: Based on Comcom Leisure Study and Radio Liberty Time-Sheet Data	Average Single-Issue Audience: Based on Total Daily Audience Estimates, Comcom Leisure Study, and Radio Liberty Data
Early morning VOA (4:00-7:59 a.m.)	2.7%	1.7%
Daytime VOA (8:00 a.m.-7:59 p.m.)	11.0	7.0
Nighttime VOA (8:00 p.m.-3:59 a.m.)	20.4	12.9
Early morning BBC (4:00-7:59 a.m.)	1.5	1.0
Daytime BBC (8:00 a.m.-7:59 p.m.)	5.9	3.7
Nighttime BBC (8:00 p.m.-3:59 a.m.)	11.5	7.3
Early morning RL (4:00-7:59 a.m.)	1.5	1.0
Daytime RL (8:00 a.m.-7:59 p.m.)	5.9	3.7
Nighttime RL (8:00 p.m.-3:59 a.m.)	11.7	7.4

*Estimates represent percentages of the 1962-63 adult Soviet population.

In so doing, however, we counted as "daily" such answers as "very often", "frequently", and "practically every day". In retrospect it is clear that this assumption may have caused the resulting audience estimates to be somewhat high. More important, our respondents were unusually prone to engage in foreign radio listening.

In practice, we used in the simulation the foreign radio audience estimates derived from the Comcom Leisure Study and Radio Liberty data.[1] This may have resulted in as much as a fifty per cent overestimate of foreign radio listening in our computer simulation output. That fact is taken account of in our discussion in the text. On the other hand, the higher estimates should be kept in mind as more representative of contemporary Russia, even if not of 1963.

---

[1] A third type of data we had available, which also related to the size of the Soviet foreign radio audience, was the number of sets in use during 1963. As indicated in n. on p. , there were approximately 32 million such sets in use in the USSR in 1963. Unfortunately, we had no reliable information on listening density (average number of listeners per set) which could be used to convert these set estimates to audience estimates. It is interesting to note, however, that if we assume at least two-thirds of these receivers were equipped with short wave bands and half of the latter were turned on during the peak period of foreign radio listening, and if we further assume an average listening density of 2.0 adults per wave set, we obtain a set of audience estimates which falls between the two sets shown in Table 4.25. We speculate that an estimation procedure based on these assumptions might have provided a more reasonable set of audience figures for incoming foreign radio transmissions than the figures that were actually used in the simulation.

We observe, however, that on an absolute basis the range between

Distributing daily audiences across cells

Having estimated the size of each foreign radio medium's average audience, our next stop was to estimate the distributions of these audiences over socially and demographically defined subgroups of the adult 1963 Soviet population. We now proceed to describe how that was done.

Findings of the Leisure Study and other studies

The results of the Comcom Leisure Study, and the earlier Harvard study, established a picture of the Soviet foreign radio audience which may be summarized as follows: Between 1940 and 1963 the number of wave radio sets in the USSR increased from 1 to 32 million. However, in the early 1960's these sets still were disproportionately concentrated in the urban centers. As a result, foreign radio broadcasts were accessible to a greater percentage of these people (probably a majority) than by others, as well as by disproportionately large segments of the young and males. Differences in foreign radio listening by Party membership were considerably smaller than those by age, urbanism, and education.

---

the high and low estimates in Table 4.25 is rather small in all but the case of the "nighttime" time slot. But even in that case it is not great enough to invalidate or compromise the simulation results with respect to foreign radio, which are described in Chapters VI and VII. It is important to remember that our audience estimates for Soviet print and electronic media may have been somewhat inflated as well (see n. , p. and n. , p.).

Table 4.26 shows the education breakdown of a sample of several hundred Radio Liberty listeners, with the data grouped in such a way as to make it comparable with the results of the Comcom Leisure study for the three major foreign stations. The similarity of these two breakdowns, together with the factors discussed earlier, serve to establish a degree of confidence in the Leisure Study data on foreign radio consumption. Accordingly, we used that data to estimate audience distributions for the foreign radio media in the simulation.

Using the Mosteller technique to construct sample computer audiences

Faced again with the kind of assignment problem described in Chapter II, we used the Mosteller technique to construct a five-dimensional computer representation of the 1963 adult Soviet audience of each foreign radio medium in the simulation from five one-dimensional tables estimated for that audience from the Leisure Study data. In the absence of more than sparse marginal data on each foreign radio medium's audience, we again, as with Soviet print and electronic media, biased each Mostellerized audience distribution toward the more firmly established 1963 population distribution by initializing the cells of each five-dimensional table with the sample computer population's cell values.

Table 4.26--Education breakdown of VOA, BBC, and Radio Liberty listeners in the Leisure Study sample and a larger sample of Radio Liberty listeners.

Education	Comcom	Radio Liberty
Higher (>10 yrs.)	39.4%[a]	36.0%[b]
Secondary or less (≤10 yrs.)	60.6	64.0

[a]N=94.

[b]Figures are based on several hundred letters received by Radio Liberty from their listeners. We adduced the approximate education breakdown from the published occupation breakdown of these listeners (Radio Liberty Committee, Annual Report of the Committee, November 30, 1964, p. 12).

Plausibility of the resulting listenership distributions

Table 4.27 shows the marginal percentage breakdown, on each cell-defining dimension, produced by the Mosteller technique in the sample computer audiences for the foreign radio media in the simulation. For every medium these simulated audience breakdowns were virtually identical with the corresponding breakdowns in the weighted Leisure Study sample, just as they were in the case of Soviet print and electronic media, providing additional evidence of the Mosteller technique's effectiveness.

Table 4.28 compares the marginal percentage breakdown, on each cell-defining dimension, of the simulation population and the total simulated Soviet audience of foreign radio. We note that males, persons between the ages of sixteen and twenty-nine, persons having ten or more years of education, and urbanites were all, in varying degrees, overrepresented in the total sample computer audience of foreign radio. These results are consistent with the audience structure discussed in Chapter I and reviewed at the beginning of this section. They therefore provide support for the plausibility of the foreign radio audience distributions mapped into computer storage from the weighted Leisure Study sample.[1]

---

[1]An "oral agitation" medium was also conceptualized in the simulation. On the basis of the information summarized in Chapter I (p. , n.) and in Rogers, "The Soviet Audience" (p. 186), we assumed that members of the Soviet population who would have attended oral agitation meetings attended, on the average, one such meeting during each of the ten-day periods following the Cuban crisis and the Kennedy assassination. In other words, we specified one "issue" of

Table 4.27--Marginal percentage breakdowns, on cell-defining dimensions, of the sample computer audience of each simulated foreign radio medium.*

Medium	PERCENTAGE MARGINAL												
	Male	Female	16-29	30-49	50+	<4	≥4,<7	≥7,≤10	>10	Party	Non Party	Urban	Rural
Early morning VOA (4:00-7:59 a.m.)	67.3	32.7	65.0	23.0	12.0	10.0	18.0	34.0	38.0	5.5	94.5	52.0	48.0
Daytime VOA (8:00 a.m.-7:59 p.m.)	67.3	32.7	65.0	23.0	12.0	10.0	18.0	34.0	38.0	5.5	94.5	52.0	48.0
Nighttime VOA (8:00 p.m.-3:59 a.m.)	67.3	32.7	65.0	23.0	12.0	10.0	18.0	34.0	38.0	5.5	94.5	52.0	48.0
Early morning BBC (4:00-7:59 a.m.)	56.7	43.3	54.0	24.0	22.0	10.0	16.0	30.0	44.0	6.1	93.9	52.4	47.6
Daytime BBC (8:00 a.m.-7:59 p.m.)	56.7	43.3	54.0	24.0	22.0	10.0	16.0	30.0	44.0	6.1	93.9	52.4	47.6
Nighttime BBC (8:00 p.m.-3:59 a.m.)	56.7	43.3	54.0	24.0	22.0	10.0	16.0	30.0	44.0	6.1	93.9	52.4	47.6
Early morning RL (4:00-7:59 a.m.)	63.5	36.5	64.0	26.0	10.0	11.0	25.0	28.0	36.0	11.6	88.4	55.1	44.9
Daytime RL (8:00 a.m.-7:59 p.m.)	63.5	36.5	64.0	26.0	10.0	11.0	25.0	28.0	36.0	11.6	88.4	55.1	44.9
Nighttime RL (8:00 p.m.-3:59 a.m.)	63.5	36.5	64.0	26.0	10.0	11.0	25.0	28.0	36.0	11.6	88.4	55.1	44.9

Table 4.27--Continued

*Because the number of Comcom respondents who reported listening, either in "early morning", "daytime", or "nighttime", to any of the three major foreign radio stations was so small, we used the total daily audience of each station as a base for estimating the marginal distribution of its average daily audience. Lacking additional information we used the resulting "average" audience distribution for a given station in each of the three time slots.

Table 4.28--Marginal percentage breakdowns, on cell-defining dimensions, of the simulation population and the total simulated foreign radio audience.

Dimension Level	Simulation Population (N=1,200)	Total Simulated Foreign Radio Audience (N=860)
Sex		
Male	42	56
Female	58	44
Age		
16-29	36	62
30-49	37	14
50+	27	14
Education		
<4 yrs.	34	10
≥4,<7 yrs.	28	18
≥7,≤10 yrs.	34	31
>10 yrs.	4	41
Political Involvement		
Party Member	6	7
NonParty Member	94	93
Residence		
Urban	50	52
Rural	50	48

Distributing Soviet Audiences Within Demographic and Social Strata of the Sample Computer Population: The Problem of Cumulation

In the first section of this Chapter we described how a sample computer population was distributed across ninety-six Soviet audience types defined by five dimensions. In the next section we explained how individual communications media were defined, how the size of each medium's audience was estimated, and how each audience was then distributed across the ninety-six audience types.

---

the oral agitation medium for each of the two scenarios. Inkeles, in his landmark study of Soviet communication, reported that attendance at oral agitation meetings ran as low as 10 per cent, in many places averaged as little as 25 to 30 per cent, and frequently could not be got above 50 per cent without extra effort (Public Opinion in Soviet Russia, p. 122). On the basis of this information and the fact that oral agitation had declined in importance as a source of news for the Soviet population since the time Inkeles wrote, we assumed the average attendance at an oral agitation meeting in 1962-63 ran at about 35 per cent of the target population. The latter, we assumed, consisted primarily of blue collar and farm workers, which Kramer has estimated as 80 per cent of the adult population ("The Population of the Soviet Union"). Thus, in the simulation we specified an average oral agitation audience of 35% x 80% = 28 per cent of the adult 1962-63 Soviet population, or 43.5 million persons.

The marginal percentage breakdown of this audience on each cell-defining dimension was established in relation to the corresponding breakdowns for the all-Union newspaper Trud, which we assumed, attracted the same type of audience as oral agitation meetings. Specifically, we set the "sex" and "residence" distributions equal to those for the readers of Trud, the "political involvement" distribution one-quarter as Party-affiliated as that for the readers of Trud, the "age" distribution somewhat older than that for the readers of Trud, and the "education" distribution somewhat less educated than that for the readers of Trud.

Within a given audience type the ratio of the resulting audience of any medium to the number of people of that type represents the average probability of exposure to the medium for that audience type. Thus, for each medium in the simulation the next step was to assign exposure probabilities to individual audience members of each type in such a way that the mean exposure probabilities (or cell means) for each type would be reproduced.

In Chapter II we showed how, for any communication medium, the distribution of exposure probabilities over the population, and over audience types within the population, governs (1) the rate of cumulative exposure to the medium, and (2) the distribution of exposure frequencies over the medium's audience. We also explained how the cumulation rate and the frequency distribution are affected by the degree of structure in a medium's audience--i.e., by the extent to which the population can be divided into subgroups of users of the medium each having a mean exposure probability divergent from the overall population mean. The simulation is programmed to account both for the distribution and structure of any medium's audience by dividing the population into three groups--regular users or subscribers, modrate or casual users, and very infrequent users of the medium. For each of these groups a beta function distribution of probabilities is generated which is consistent with the group's size, and with the average audience and the two-issue cumulative audience for the group. Probabilities are then allocated from each of the three distributions to members of each audience type or cell in such a way as to preserve the medium's cell means and its overall one- and two-issue cumulative audiences.

Accordingly, for each medium in the Soviet simulation we had to specify three distributions of probabilities, each defined in terms of its size, average audience, and two-issue cumulative audience. We now proceed to describe how these parameters were estimated for the three distributions specified for each medium in the simulation.

Readership Cumulation for Soviet Newspapers and Magazines

For each simulated Soviet print medium we first estimated the sizes of regular, moderate, and infrequent user distributions as well as the size of the average single-issue readership in each. Figure 4.3 illustrates how this was done for the all-Union youth paper *Komsomolskaya pravda*. The basic procedure was to combine the estimated numbers of institutional and individual subscribers, retail consumers, and pass-on recipients of a paper with the estimated readership rates in each of these categories.[1] (We described how these estimates were made on pp.   above.)

To obtain the total number of readers of institutionally subscribed copies, we multiplied the estimated number of institutional subscriptions by the estimated number of persons having access to an

[1] For the reasons outlined earlier in this chapter, we assumed that the uniform application of recipient-category and readership rates estimated for newspapers as a whole to each individual newspaper medium in the simulation would not produce a significant error in the distribution sizes and readership means estimated for print media as a whole.

Name of print medium: Komsomolskaya pravda

Estimated institutional subscriptions = 0.49 million[a]

Institutional subscribers = $15^{a} \times 0.49$ = 7.36

Individual subscribers = 2.78[a]

Regular readers = 10.14

Average regular readership = $(7.36/10.14)85\%^{a} + (2.78/10.14)88\%^{a}$ = 85%

Retail sales = 0.58[a]

Pass-ons = 2.05[a]

Moderate readers = 2.63

Average moderate readership = $(0.58/2.63)76\%^{a} + (2.05/2.63)73\%^{a}$ = 74%

Infrequent readers = $155.0^{b} - 10.14 - 2.63$ = 142.23

Average infrequent readership = $(10.64^{a} - 10.14 \times 85\% - 2.63 \times 74\%)/142.23$ = 11%

[a]For the derivation of this statistic see Figure 4.1 above and pp.

[b]Estimated size of the 1962-63 adult Soviet population

Fig. 4.3--Estimating the sizes of, and the average per issue readerships in, regular, moderate, and infrequent user distributions for Komsomolskaya pravda.

average institutional newspaper copy. The result when added to the estimated number of individual subscribers, gave an estimate of the size of the regular reader distribution. We obtained the average per issue readership among regular users simply by taking the weighted sums of the corresponding statistic for institutional and individual subscribers.

To estimate the size of the moderate reader distribution, we summed the estimated number of retail consumers and pass-on recipients of the paper. The weighted sum of the average per issue readerships among retail consumers and pass-along readers formed our estimate of the average single-issue readership among moderate users of the medium.

Having estimated the size and average single-issue readership for both the regular and moderate user distributions, we computed the size of the infrequent user distribution as the remainder of the adult 1962-63 Soviet population, and we computed the average per issue readership for this distribution as the remainder of the paper's per issue readership divided by the distribution's size.

Table 4.29 shows, for each Soviet print medium in the simulation, the sizes and average per issue readerships calculated for the regular, moderate, and infrequent user distributions by means of the procedure described above.

In Chapter II (p.   , n.   ) we alluded to an important constraint, arising from the beta function model, which relates the size of the average audience and the maximum reproducible size of the two-issue

Table 4.29--Distribution sizes and average single-issue readerships, by distribution, for each simulated Soviet print medium.

Title or Type	Distribution: Regular Size	Regular Av. Readership	Moderate Size	Moderate Av. Readership	Infrequent Size	Infrequent Av. Readership	Total Size	Total Av. Readership
All-Union Newspapers								
Pravda	11.0%*	9.4%	3.0%	2.2%	86.0%	0.2%	100.0%	11.8%
Izvestia	8.6	7.3	2.5	1.8	88.9	0.1	100.0	9.2
Trud	2.6	2.2	0.8	0.6	96.6	0.0	100.0	2.8
Komsomolskaya pravda	6.6	5.6	1.6	1.2	91.8	0.1	100.0	6.9
Literaturnaya gazeta	2.0	1.7	0.5	0.4	97.5	0.0	100.0	2.1
Ekonomicheskaya gazeta	0.8	0.7	0.2	0.1	99.0	0.0	100.0	0.8
Selskaya zhizn	5.4	4.6	1.4	1.0	93.2	0.1	100.0	5.7
Nedelya	2.4	2.0	0.5	0.5	97.1	0.0	100.0	2.6
Krasnaya zvezda	1.0	0.9	1.3	0.9	97.7	0.0	100.0	1.8
All Others Published 2 Per Week	5.0	4.2	1.2	0.9	93.8	0.1	100.0	5.2
All Others Published 3 Per Week	2.4	2.1	0.7	0.4	96.9	0.0	100.0	2.5
All-Union Magazines								
Ogonyok	4.0	3.4	0.9	0.8	95.1	0.0	100.0	4.2
Krokodil	3.3	2.8	0.8	0.7	95.9	0.0	100.0	3.5

Table 4.29--Continued

	Distribution							
	Regular		Moderate		Infrequent		Total	
Title or Type	Size/Av.	Readership	Size/Av.	Readership	Size/Av.	Readership	Size/Av.	Readership
				Republic Newspapers				
Sovietskaya Rossia	3.8%	3.2%	1.0%	0.8%	95.2%	0.0%	100.0%	4.0%
Kazakhstan Party-Govt. Papers	0.7	0.6	0.3	0.1	99.0	0.0	100.0	0.7
Central Asian Party-Govt. Papers	2.1	1.8	0.6	0.4	97.3	0.0	100.0	2.2
Transcaucasian Party-Govt. Papers	2.0	1.7	0.5	0.4	97.5	0.0	100.0	2.1
Baltic Party-Govt. Papers	2.1	1.8	0.6	0.4	97.3	0.0	100.0	2.2
European Party-Govt. Papers	4.2	3.6	1.1	0.8	94.7	0.0	100.0	4.4
All Komsomol Papers Published 3 Per Week	1.0	0.9	0.2	0.2	98.8	0.0	100.0	1.1
All Komsomol Papers Published 5 Per Week	2.2	1.8	0.5	0.5	97.3	0.0	100.0	2.3
All Others Published 1 Per Week	3.4	2.9	0.8	0.7	95.8	0.0	100.0	3.6
All Others Published 2 Per Week	1.7	1.4	0.4	0.3	97.9	0.0	100.0	1.7
All Others Published 3 Per Week	0.8	0.7	0.2	0.1	99.0	0.0	100.0	0.8
All Others Published 5 Per Week	0.3	0.3	0.2	0.1	99.5	0.0	100.0	0.4
				SubRepublic Newspapers				
All Komsomol Papers Published 3 Per Week	5.5	4.7	1.4	1.0	93.1	0.1	100.0	5.8
All Others Published 1 Per Week	3.4	2.9	0.8	0.7	95.8	0.0	100.0	3.6
All Others Published 2 Per Week	1.2	1.1	0.4	0.2	98.4	0.0	100.0	1.3
All Others Published 3 Per Week	14.1	12.5	4.3	2.7	81.6	0.2	100.0	15.4
All Others Published 4 Per Week	4.4	3.7	1.1	0.8	94.5	0.1	100.0	4.6
All Others Published 5 Per Week	8.5	7.2	2.2	1.6	89.3	0.1	100.0	8.9
All Others Published 6 Per Week	14.1	12.0	3.6	2.7	82.3	0.1	100.0	14.8

*The percentages are based on the total adult 1962-63 Soviet population.

cumulative audience for any distribution: the proportion of the population in the two-issue cumulative audience may not exceed the difference between twice the average audience proportion and the square of the average audience proportion. Accordingly, the maximum relative accumulation--the two-issue cumulative audience divided by the average audience--which can be simulated for any distribution is also limited by the size of the average audience for that distribution: it may not exceed the difference between 2.0 and the average audience proportion. Since the possible values of the average audience proportion lie between 0.0 and 1.0, the value of the relative accumulation must be between 1.0 and 2.0; moreover, the larger the average audience, the smaller must be the relative accumulation.

From the distribution sizes and average readerships shown in Table 4.29, we were able to calculate the maximum reproducible values of the two-issue cumulative readerships for the three subdistributions and the total distribution associated with each simulated print medium. These values are shown in Table 4.30. Dividing each maximum two-issue cumulative readership by the corresponding average single-issue readership, we obtained the maximum reproducible relative accumulation for each simulated print medium. These maximum values for the population structured by three distributions are shown in Table 4.31, along with the maximum values implied by the total average readership of each print medium--i.e., the maximum relative accumulations in an unstructured population.

We note that structuring the population into three reader

Table 4.30--Maximum Two-Issue Cumulative Readerships, by Distribution, for Each Simulated Soviet Print Medium.

Title or Type	Distribution: Regular	Moderate	Infrequent	Total
All-Union Newspapers				
Pravda	10.7%*	2.8%	0.4%	13.9%
Izvestia	8.4	2.3	0.2	10.9
Trud	2.5	0.7	0.0	3.2
Komsomolskaya pravda	6.4	1.5	0.2	8.1
Literaturnaya gazeta	1.9	0.5	0.0	2.4
Ekonomicheskaya gazeta	0.8	0.2	0.0	1.0
Selskaya zhizn	5.3	1.3	0.1	6.7
Nedelya	2.3	0.5	0.0	2.8
Krasnaya zvezda	1.0	1.2	0.1	2.3
All Others Published 2 Per Week	4.9	1.1	0.1	6.1
All Others Published 3 Per Week	2.3	0.6	0.1	3.0
All-Union Magazines				
Ogonyok	3.9	0.9	0.9	5.7
Krokodil	3.2	0.8	0.1	4.1

Table 4.30--Continued

Title or Type	Distribution Regular	Moderate	Infrequent	Total
	Republic Newspapers			
Sovietskaya Rossia	3.7%	1.0%	0.1%	4.8%
Kazakhstan Party-Govt.Papers	0.7	0.3	0.0	1.0
Central Asian Party-Govt.Papers	2.1	0.6	0.0	2.7
Transcaucasian Party-Govt.Papers	2.0	0.5	0.0	2.5
Baltic Party-Govt.Papers	2.0	0.6	0.1	2.7
European Party-Govt.Papers	4.1	1.0	0.1	5.2
All *Komsomol* Papers Published 3 Per Week	1.0	0.2	0.0	1.2
All *Komsomol* Papers Published 5 Per Week	2.2	0.5	0.0	2.7
All Others Published 1 Per Week	3.3	0.7	0.1	4.1
All Others Published 2 Per Week	1.7	0.4	0.1	2.2
All Others Published 3 Per Week	0.8	0.2	0.0	1.0
All Others Published 5 Per Week	0.3	0.2	0.0	0.5
	SubRepublic Newspapers			
All *Komsomol* Papers Published 3 Per Week	5.4	1.3	0.1	6.8
All Others Published 1 Per Week	3.3	0.7	0.1	4.1
All Others Published 2 Per Week	1.2	0.4	0.0	1.6
All Others Published 3 Per Week	13.8	4.0	0.3	18.1
All Others Published 4 Per Week	4.3	1.0	0.1	5.4
All Others Published 5 Per Week	8.3	2.0	0.2	10.5
All Others Published 6 Per Week	13.8	3.3	0.3	17.4

*The percentages are based on the total adult 1962-63 Soviet Population.

Table 4.31--Comparison of the Maximum Relative Accumulations, for each Simulated Soviet Print Medium, Under the One-and-Three-Beta Function Models.

Title or Type	Maximum Relative Accumulation: Three Distributions	One Distribution
	All-Union Newspapers	
Pravda	1.18	1.88
Izvestia	1.18	1.91
Trud	1.17	1.97
Komsomolskaya pravda	1.14	1.93
Literaturnaya gazeta	1.14	1.98
Economicheskaya gazeta	1.25	1.99
Selskaya zhizn	1.17	1.94
Nedelya	1.08	1.97
Krasnaya zvezda	1.28	1.98
All Others Published 2 Per Week	1.17	1.95
All Others Published 3 Per Week	1.20	1.97
	All-Union Magazines	
Ogonyok	1.35	1.96
Krokodil	1.17	1.96

Table 4.31--Continued

Title or Type	Maximum Relative Accumulation Three Distributions	One Distribution
	Republic Newspapers	
Sovietskaya Rossia	1.20	1.96
Kazakhstan Party-Govt. Papers	1.43	1.99
Central Asian Party-Govt. Papers	1.23	1.98
Transcaucasian Party-Govt. Papers	1.19	1.98
Baltic Party-Govt. Papers	1.23	1.98
European Party-Govt. Papers	1.18	1.96
All *Komsomol* Papers Published 3 Per Week	1.09	1.99
All *Komsomol* Papers Published 5 Per Week	1.17	1.98
All Other Papers Published 1 Per Week	1.14	1.96
All Other Papers Published 2 Per Week	1.29	1.98
All Other Papers Published 3 Per Week	1.25	1.99
All Other Papers Published 5 Per Week	1.25	1.99
	SubRepublic Newspapers	
All *Komsomol* Papers Published 3 Per Week	1.17	1.94
All Others Published 1 Per Week	1.14	1.96
All Others Published 2 Per Week	1.23	1.99
All Others Published 3 Per Week	1.17	1.85
All Others Published 4 Per Week	1.17	1.95
All Others Published 5 Per Week	1.18	1.91
All Others Published 6 Per Week	1.18	1.85

distributions, each with a different average readership probability, sharply lowered the maximum relative accumulation for each medium. In fact, when we compare the two-issue cumulation percentages in Table 4.30 with the distribution sizes and one-issue readership percentages in Table 4.29, we observe that there simply was no possibility of a significant growth in exposure, on a population-wide basis, in any of the three distributions associated with a print medium. The regular distribution population was almost completely (85 per cent) exposed to the first issue; the size of the moderate distribution population was so small (between 0.2 and 3.6 per cent of the total population) that cumulative exposure within it was insubstantial; and exposure to each issue in the infrequent distribution population was so small (between 0.0 and 0.2 per cent of the population) that it did not accumulate significantly over repeated issues. We note, however, that virtually all of the limited cumulation possible was restricted to the one to eighteen per cent of the population in the regular and moderate reader distributions. Accordingly, it mattered little what figures were chosen for the two-issue cumulations in the infrequent distributions; the significant figures were those for the regular and moderate distributions.[1]

---

[1] It is interesting to compare this result with Kramer's findings in the Cincinnati simulation, which encompassed a metropolitan rather than a national population. In the Cincinnati case, a significant increase in newspaper exposure was possible in the moderate user distribution, because one-half to one-quarter of the simulation population fell in that distribution. In the Soviet case, however, no significant increase in print exposure was possible (on a national basis), because the regular and moderate user distribution populations

We had no data relating directly to Soviet newspaper (or magazine) cumulation. We did have some information on cumulation rates for U.S. newspapers, however, from the 1961 newspaper readership study mentioned in Chapter I.[1] For all the daily newspapers in the study (with a total average readership of 81.9 per cent of the adult population), the relative accumulation value was 1.05. With little more than this data for guidance, we arbitrarily set the value of the relative accumulation for each regular reader distribution at 1.05. This amounted to having the second issue expose 91.3 per cent of those who would have been newly exposed if exposure were completely random from issue to issue within the distribution. Since the average readership proportion was somewhat lower in the moderate reader distribution (73 per cent) than in the regular reader distribution (85 per cent), we assumed the moderate distribution's relative accumulation would be somewhat higher. We therefore arbitrarily set the value of the relative accumulation for each moderate distribution at 1.25, which amounted to having the second issue expose 97.4 per cent of those who would have been newly exposed if exposure were completely random from issue to issue within the distribution population.

represented such small shares of the national population. This difference reflects the fact that the newspapers represented in the Cincinnati simulation had substantial average readerships on a population-wide basis, while the print media conceptualized in the Soviet simulation had, with but few exceptions, very small average readerships as a percentage of the simulation population.

[1]See p. , n.

Following out this line of reasoning for the infrequent reader distributions (average readerships of less than 0.1 per cent), we arbitrarily set their relative accumulations at the maximum reproducible value, which amounted to having the second issue expose 100.0 per cent of those who would have been newly exposed if exposure were completely random from issue to issue within the distribution population. Table 4.32 displays the resulting readership cumulations.

Audience Cumulation for Soviet Radio and Television

For each simulated Soviet electronic medium we first estimated the sizes of regular, moderate, and infrequent user distributions as well as the average daily audience within each distribution population. We based these estimates on data from the Comcom Leisure Study and the Komsomolskaya pravda poll, cited earlier, regarding respondents' frequencies of radio and TV consumption. The pertinent data are summarized in Table 4.33.

To use these data we arbitrarily defined each regular listener (viewer) distribution as consisting of persons who listened (watched) at least several times per week, and each moderate listener (viewer) distribution as consisting of persons who listened (watched) at least several times per month. We then estimated the sizes of regular and moderate user distributions for the Soviet radio (TV) audience as a whole by taking the weighted sum of the listening (viewing)

Table 4.32--Two-Issue Cumulative Readerships, by Distribution, for Each Simulated Soviet Print Medium.

Title or Type	Distribution: Regular	Moderate	Infrequent	Total	Relative Accumulation
All-Union Newspapers					
Pravda	9.9%*	2.7%	0.4%	13.0%	1.10
Izvestia	7.7	2.2	0.2	10.1	1.10
Trud	2.4	0.6	0.0	3.0	1.07
Komsomolskaya pravda	5.8	1.6	0.2	7.6	1.10
Literaturnaya gazeta	1.8	0.5	0.0	2.3	1.09
Ekonomicheskaya gazeta	0.7	0.2	0.0	0.9	1.12
Selskaya zhizn	4.8	1.3	0.1	6.2	1.09
Nedelya	2.1	0.7	0.0	2.8	1.08
Krasnaya zvezda	0.9	1.1	0.1	2.1	1.17
All Others Published 2 Per Week	4.5	1.1	0.1	5.7	1.10
All Others Published 3 Per Week	2.2	0.6	0.0	2.8	1.12
All-Union Magazines					
Ogonyok	3.6	0.9	0.1	4.6	1.09
Krokodil	3.0	0.7	0.1	3.8	1.08

Table 4.32--Continued

Title or Type	Regular	Moderate	Infrequent	Total	Relative Accumulation
			Distribution		
			Republic Newspapers		
Sovietskaya Rossia	3.4%	0.9%	0.1%	4.4%	1.10
Kazakhstan Party-Govt.Papers	0.6	0.2	0.0	0.8	1.14
Central Asian Party-Govt. Papers	1.9	0.6	0.0	2.5	1.14
Transcaucasian Party-Govt. Papers	1.8	0.5	0.0	2.3	1.10
Baltic Party-Govt. Papers	1.9	0.4	0.1	2.4	1.09
European Party-Govt. Papers	3.7	1.0	0.1	4.8	1.09
All Komsomol Papers Published 3 Per Week	0.9	0.3	0.0	1.2	1.09
All Komsomol Papers Published 5 Per Week	1.9	0.6	0.0	2.5	1.09
All Others Published 1 Per Week	3.1	0.8	0.0	3.9	1.08
All Others Published 2 Per Week	1.5	0.4	0.0	1.9	1.12
All Others Published 3 Per Week	0.7	0.2	0.0	0.9	1.12
All Others Published 5 Per Week	0.3	0.1	0.0	0.4	1.10
			SubRepublic Newspapers		
All Komsomol Papers Published 3 Per Week	4.9	1.3	0.1	6.3	1.09
All Others Published 1 Per Week	3.1	0.7	0.1	3.9	1.08
All Others Published 2 Per Week	1.1	0.3	0.0	1.4	1.08
All Others Published 3 Per Week	13.1	3.4	0.3	16.8	1.09
All Others Published 4 Per Week	3.9	1.0	0.2	5.1	1.11
All Others Published 5 Per Week	7.5	2.1	0.2	9.8	1.10
All Others Published 6 Per Week	12.5	3.3	0.3	16.1	1.09

*The percentages are based on the total adult 1962-63 Soviet population.

Table 4.33--Frequency of radio and television consumption, by education, in the Comcom Leisure Study sample.

Education	Radio		Television		
	Listened at Least Several Times a Week[a]	Listened at Least Several Times a Month[b]	Watched at Least Several Times a Week	Watched at Least Several Times a Month	Comcom Leisure Study Sample (N)[c]
Higher (>10 yrs.)	79%	19%	40%	51%	(43)
Secondary (=10 yrs.)	80	14	36	45	(33)
Less Than Secondary (<10 yrs.)	75	22	32	35	(31)
					(N=107)

[a]These figures are from the Komsomolskaya pravda poll, because Comcom respondents were not asked about their frequency of radio listening.

[b]These figures were computed by subtracting Komsomolskaya pravda listening percentages (column one) from Comcom Leisure Study percentages for those who listened at all (higher--98%, secondary--94%, less than secondary--97%).

[c]Total figures on the basis of which Comcom percentages were calculated.

percentages in the three education categories. The calculations are shown below:

Radio

Regular

(79% x 0.04[1] + 80% x 0.34[1] + 75% x 0.62[1])155 million = 118.4 million

Moderate

(19% x 0.04 + 14% x 0.34 + 22% x 0.62) 155 million = 30.1 million

Television

Regular

(40% x 0.04 + 36% x 0.34 + 32% x 0.61)155 million = 52.2 million

Moderate

(51% x 0.04 + 45% x 0.34 + 35% x 0.61)155 million = 60.5 million

The next step was to compute average daily audience proportions for these distributions. This required that we estimate the sizes of the total daily radio and TV audiences. The estimates were obtained by summing the largest central and local audiences in a given time slot, both for radio and TV, and subtracting an assumed amount of audience overlap in each case, as shown below:

[1]Percentage of the adult Soviet population having higher, secondary, and less than secondary education respectively, according to the 1959 all-Union census.

Radio		Television	
30.0 million	(early morning central)	24.4 million	(nighttime central)
+ 79.5 million	(early morning regional)	+40.8 million	(nighttime regional)
109.5 million		65.2 million	
- 5.1 million	(1/3 chance overlap)	- 20.2 million	(chance overlap)
104.4 million	(estimated total daily audience)	45.0 million	(estimated total daily audience)

We then experimented with various combinations of average daily audience proportions for the regular and moderate radio and TV distributions until we found a plausible set which reproduced values slightly less than these total daily audience figures. The results are summarized below:

Soviet Radio

118.4 million x 0.8 + 30.1 million x 0.2 = 100.7 million

Soviet TV

52.2 million x 0.7 + 60.5 million x 0.1 = 42.6 million

In the absence of more detailed data we treated each simulated radio and television medium the same way, specifying as the average daily audience proportions 0.8 and 0.2 of the regular and moderate listener distributions respectively, and 0.7 and 0.1 of the regular and moderate viewer distributions respectively. The sizes of these two distributions for any radio or TV medium were computed as a multiplicative function of (1) the medium's average daily audience, (2) the total daily radio or TV audience, and (3) the distribution size for the medium as a whole, as follows:

Radio

No. of regular listeners = (medium's av. aud./total daily aud.)
118.4 million

No. of moderate listeners = (medium's av. aud./total daily aud.)
30.1 million

Television

No. of regular viewers = (medium's av. aud./total daily aud.)
52.2 million

No. of moderate viewers =(medium's av. aud./total daily aud.)
60.5 million

Having estimated the size and average daily audience proportion for each of the regular and moderate user distributions, we computed the size of each infrequent user distribution as a remainder of the 1962-63 adult Soviet population, and we computed the average daily audience proportion for each infrequent user distribution as the remainder of the given electronic medium's average daily audience divided by the distribution's size. Table 4.34 shows the resulting distribution sizes and average daily audience proportions for each Soviet electronic medium in the simulation.

As with print media, we had no data bearing directly on the cumulation of Soviet radio and television audiences. We did have some information on cumulation rates for U.S. radio programs, however, from Politz's 1953 audience study cited in Chapter I.[1]

---

[1]See p. , n.

Table 4.34--Distribution sizes and average daily audiences, by distribution, for each simulated Soviet electronic medium.

Medium	Distribution							
	Regular Size	Regular Av.Aud.	Moderate Size	Moderate Av.Aud.	Infrequent Size	Infrequent Av.Aud.	Total Size	Total Av.Aud.
Radio								
Early morning central (5:30-8:29 a.m.)	22.1%*	17.6%	5.5%	1.1%	72.4%	0.6%	100.0%	19.3%
Lunchtime central (noon-2:59 p.m.)	36.8	29.4	9.3	1.8	53.9	1.0	100.0	32.2
Early evening central (6:00-9:29 p.m.)	39.1	31.2	9.9	2.0	51.0	1.1	100.0	34.3
Late evening central (9:30 p.m.-5:29 a.m.)	15.8	12.6	4.0	0.9	80.2	0.4	100.0	13.9
Early morning regional (5:30-8:29 a.m.)	58.5	46.7	14.8	2.9	26.7	1.6	100.0	51.2
Lunchtime regional (noon-2:59 p.m.)	9.7	7.8	2.4	0.7	87.9	0.3	100.0	8.5
Early evening regional (6:00-9:29 p.m.)	20.0	16.0	5.0	1.0	75.0	0.5	100.0	17.5
Late evening regional (9:30 p.m.-5:29 a.m.)	9.3	7.4	2.2	0.5	88.5	0.2	100.0	8.1
Midmorning (8:30-11:59 a.m.)	2.9	2.4	0.7	0.1	96.4	0.1	100.0	2.6
Afternoon (3:00-5:59 p.m.)	6.6	5.3	1.6	0.3	91.8	0.2	100.0	5.8
Television								
Daytime central (11:00 a.m.-5:59 p.m.)	3.0	2.1	3.5	0.4	93.5	0.1	100.0	2.6
Nighttime central (6:00 p.m.-midnight)	18.2	12.7	21.2	2.1	60.6	0.9	100.0	15.7
Daytime regional (11:00 a.m.-5:59 p.m.)	2.2	1.6	2.6	0.2	95.2	0.1	100.0	1.9
Nighttime regional (6:00 p.m.-midnight)	30.6	21.4	35.4	3.5	34.0	1.4	100.0	26.3

*The percentages are based on the total adult 1962-63 Soviet population.

Figure 4.4 shows a plot of the relative accumulation versus the average audience proportion, within various demographic categories, for the four U.S. radio programs studied by Politz. Treating these points as a scatter diagram, we used a "least squares" type of curve to estimate the two-day cumulation for each Soviet radio and TV distribution in the simulation. The resulting values are shown in Table 4.35.[1]

Cumulation for the Soviet Audience of Foreign Radio

For each simulated foreign radio medium we used listening data from the Comcom Leisure Study to estimate the sizes of regular, moderate, and infrequent user distributions and the proportion of each distribution population in the average audience. Table 4.36 displays the data that were used.

As with Soviet domestic electronic media, we again defined regular listeners to be persons who listened at least several times per week, and moderate listeners to be persons who listened at least several times per month. We then estimated the sizes of regular and moderate user distributions for the total Soviet audiences of

---

[1] Specifically, we used this method to estimate the two-day cumulations for the moderate user, regular user, and total distributions, and we computed the two-day cumulation for the infrequent user distribution by subtraction.

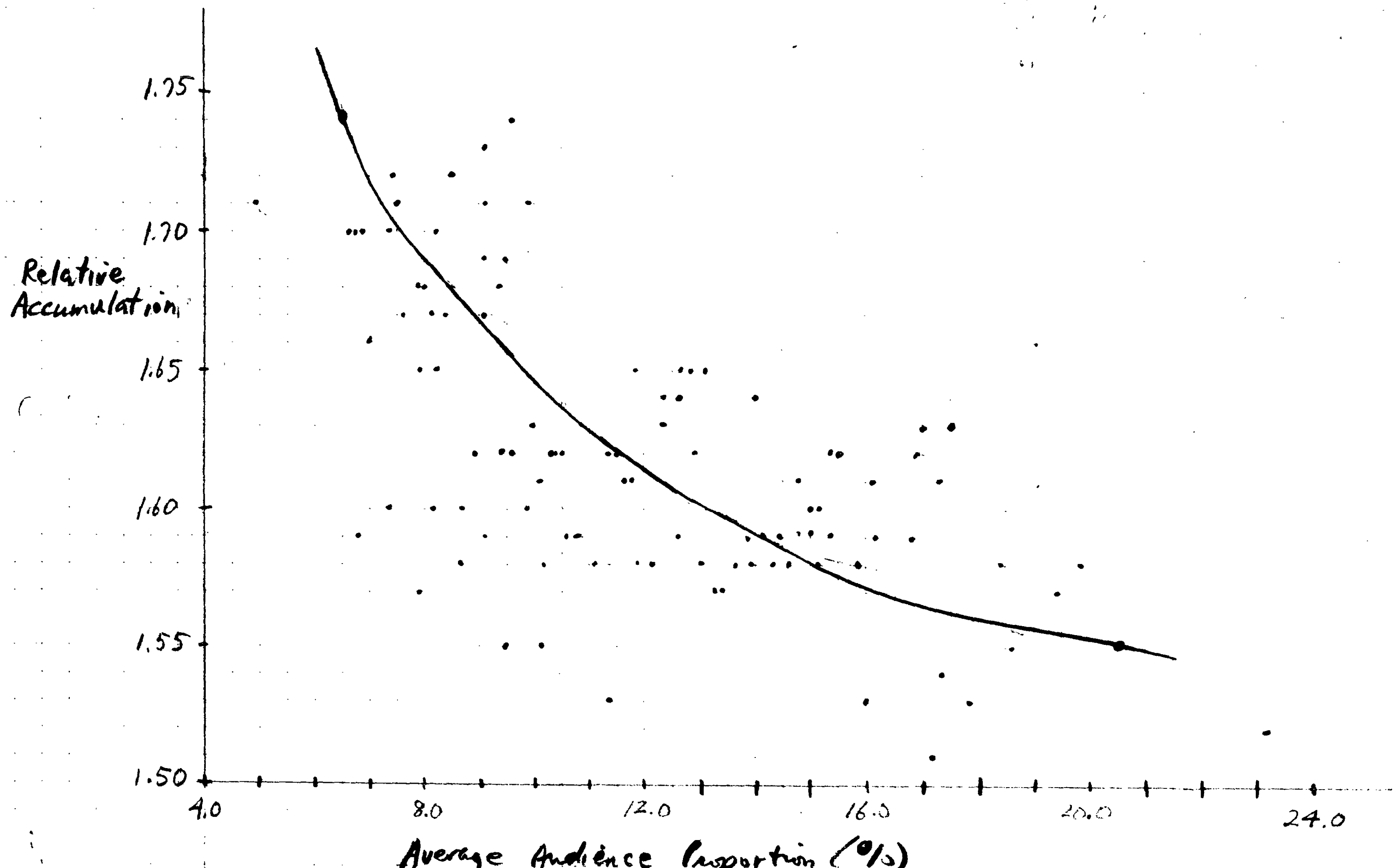


Fig. 4.4--Relative accumulation vs. average audience proportion for four U.S. radio programs

Table 4.35--Two-Day Cumulative Audiences, by Distribution, for each Simulated Soviet Electronic Medium.

Medium	Distribution				Relative
	Regular	Moderate	Infrequent	Total	Accumulation
Radio					
Early morning central (5:30-8:29 a.m.)	18.5%*	10.3%	1.2%	30.0%	1.50
Lunchtime central (noon-2:59 p.m.)	30.9	13.6	1.9	46.4	1.44
Early evening central (6:00-9:29 p.m.)	32.9	13.8	2.1	48.8	1.42
Late evening central (9:30 p.m.-5:29 a.m.)	13.3	7.9	0.8	22.0	1.58
Early morning regional (5:30-8:29 a.m.)	49.1	13.1	3.0	65.2	1.27
Lunchtime regional (noon-2:59 p.m.)	8.2	5.6	0.5	14.3	1.68
Early evening regional (6:00-9:29 p.m.)	16.8	9.6	1.0	27.4	1.56
Late evening regional (9:30 p.m.-5:29 a.m.)	7.8	5.4	0.5	13.7	1.69
Midmorning (8:30-11:59 a.m.)	2.5	2.1	0.2	4.8	1.84
Afternoon (3:00-5:59 p.m.)	5.5	4.3	0.4	10.2	1.76
Television					
Daytime central (11:00 a.m.-5:59 p.m.)	2.2	2.4	0.2	4.8	1.84
Nighttime central (6:00 p.m.-midnight)	13.4	9.6	1.7	24.7	1.57
Daytime regional (11:00 a.m.-5:59 p.m.)	1.7	1.7	0.2	3.6	1.89
Nighttime regional (6:00 p.m.-midnight)	22.4	14.2	2.7	39.3	1.49

*The percentages are based on the total adult 1962-63 Soviet population.

Table 4.36--Estimated frequency of foreign radio consumption, by education, in the Comcom Leisure Study sample.

	Listened at All[a]	Listened at Least Several Times a Week[b]	Listened at Least Several Times a Month[b]	Comcom Leisure Study Sample (N)[c]
Higher (>10 yrs.)	49%	40%	9%	(43)
Secondary (=10 yrs.)	53	45	8	(33)
Less Than Secondary (<10 yrs.)	38	29	9	(31)
				(N=107)

[a]These figures are taken directly from the Comcom Leisure Study.

[b]These figures were computed by assuming the same split between weekly and monthly viewers for foreigh radio as for domestic radio.

[c]Total figures on the basis of which percentages were calculated.

foreign radio by taking the weighted sum of the listening percentages in the three education categories. The calculations were as follows:

Regular

$$(40\% \times 0.04^{1} + 45\% \times 0.34^{1} + 29\% \times 0.62^{1})\ 155 \text{ million} = 54.6 \text{ million}$$

Moderate

$$(9\% \times 0.04 + 8\% \times 0.34 + 9\% \times 0.62)\ 155 \text{ million} = 12.9 \text{ million}$$

We next estimated the size of the total daily foreign radio audience by summing the largest audiences for VOA, the BBC, and Radio Liberty in a given time slot (the "late evening" slot in each case) and subtracting from the total an arbitrarily assumed amount substantially greater than the chance audience duplication. This calculation is shown below:

---

[1] Percentage of the adult Soviet population having higher, secondary, and less than secondary education respectively, according to the 1959 all-Union census.

$$
\begin{array}{rl}
 & 31.7 \text{ million (late evening VOA)} \\
 & 17.8 \text{ million (late evening BBC)} \\
+ & \underline{18.2 \text{ million (late evening RL)}} \\
 & 67.7 \text{ million} \\
- & \underline{32.7 \text{ million}} \quad \text{(three and one-half times the chance duplication)} \\
 & 35.0 \text{ million}
\end{array}
$$

We again tried various combinations of average daily audience proportions for the regular and moderate foreign radio distributions until we found a plausible set which reproduced values slightly less than this daily audience figure. The results are shown below:

$$54.6 \text{ million} \times \underline{\underline{0.6}} + 12.9 \text{ million} \times \underline{\underline{0.1}} = 34.0 \text{ million}$$

Lacking more detailed data on foreign radio cumulation, we treated each simulated medium in a comcom fashion, specifying 0.6

and 0.1 as the average daily audience proportions for the regular and moderate listener distributions respectively. The sizes of these two distributions for any individual foreign radio medium were computed in a manner analogous to that used for Soviet radio and TV, as follows:

No. of regular listeners = medium's av. aud./total daily aud.)
54.6 million

No. of moderate listeners = (medium's av. aud./total daily aud.)
12.9 million

Having estimated the size and average daily audience proportion for each of the regular and moderate user distributions, we computed the size of each infrequent user distribution as a remainder of the 1962-63 adult Soviet population, and we computed the average daily audience proportion for each infrequent user distribution as the remainder of the given foreign radio medium's average daily audience divided by the distribution's size. Table 4.37 shows the resulting distribution sizes and average daily audience proportions for each foreign radio medium in the simulation.

For the two-day cumulations of each foreign radio distribution we used the procedure described above for domestic radio and TV audiences, thus making the values of the relative two-day accumulations comparable to the Politz radio data cited above. The resulting values are shown in Table 4.38.[1]

---

[1]For the oral agitation medium that was conceptualized in the simulation, we estimated distribution sizes and means, and cumulative audiences, as follows: We computed the size of the infrequent user

Table 4.37--Distribution sizes and average daily audiences, by distribution, for each simulated foreign radio medium.

	DISTRIBUTION							
	Regular		Moderate		Infrequent		Total	
Medium	Size	Av. Aud.	Size	Av. Aud.	Size	Av. Aud.	Size	Av. Aud.
Early morning VOA (4:00-7:59 a.m.)	4.2%*	2.5%	1.1%	0.1%	94.7%	0.1%	100.0%	2.7%
Daytime VOA (8:00 a.m.-7:59 p.m.)	16.3	9.8	3.7	0.9	80.0	0.3	100.0	11.0
Nighttime VOA (8:00 p.m.-3:59 a.m.)	31.9	19.1	7.6	0.7	60.5	0.6	100.0	20.4
Early morning BBC (4:00-7:59 a.m.)	2.3	1.4	0.6	0.1	97.1	0.0	100.0	1.5
Daytime BBC (8:00 a.m.-7:59 p.m.)	9.1	5.5	2.1	0.1	88.8	0.2	100.0	5.8
Nighttime BBC (8:00 p.m.-3:59 a.m.)	17.9	10.7	4.1	0.5	78.0	0.3	100.0	11.5
Early morning RL (4:00-7:59 a.m.)	2.4	1.4	0.5	0.1	97.1	0.0	100.0	1.5
Daytime RL (8:00 a.m.-7:59 p.m.)	9.3	5.6	2.2	0.1	88.5	0.2	100.0	5.9
Nighttime RL (8:00 p.m.-3:59 a.m.)	18.3	11.0	4.3	0.4	77.4	0.3	100.0	11.7

*The percentages are based on the total adult 1962-63 Soviet population.

Table 4.38--Two-Day Cumulative Audiences, by Distribution, for Each Simulated Foreign Radio Medium.

Medium	DISTRIBUTION				Relative Accumulation
	Regular	Moderate	Infrequent	Total	
Early morning VOA (4:00-7:59 a.m.)	2.6%*	2.3%	0.1%	5.0%	1.85
Daytime VOA (8:00-7:59 p.m.)	10.2	6.4	0.5	17.1	1.55
Nighttime VOA (8:00 p.m.-3:59 a.m.)	20.1	10.5	1.1	31.7	1.55
Early morning BBC (4:00-7:59 a.m.)	1.5	1.3	0.1	2.9	1.93
Daytime BBC (8:00 a.m.-7:59 p.m.)	5.7	4.3	0.3	10.3	1.78
Nighttime BBC (8:00 p.m.-3:59 a.m.)	11.3	6.7	0.6	18.6	1.62
Early morning RL (4:00-7:59 a.m.)	1.5	1.3	0.1	2.9	1.93
Daytime RL (8:00 a.m.-7:59 p.m.)	5.8	4.4	0.3	10.5	1.78
Nighttime RL (8:00 p.m.-3:59 a.m.)	11.5	6.9	0.6	19.0	1.62

*The percentages are based on the total adult 1962-63 Soviet Population.

Assigning Individual Exposure Probabilities to Cells

At this stage of the simulation we had completed three basic steps:

--We had distributed a sample computer population over audience types or cells defined by exposure-related demographic and social variables.

--We had distributed the audience of each simulated medium over the cells defined by these population variables, the ratio of the audience in a cell to the population of that cell specifying a mean probability of exposure to the medium among the persons in the cell.

--For each simulated medium we had used cumulation information and beta functions to model three discrete distributions of exposure probabilities, the proportion of the medium's probabilities in each distribution agreeing with the proportion of the simulation population in that distribution, and the probabilities chosen so as to reproduce the cumulation data for each distribution and for the medium as a whole.[1]

The next step was to allocate each medium's exposure probabilities to the cells of the sample computer population in such a way

---

distribution as the total nonfarm worker and nonblue collar worker population plus 50 per cent of the farm and blue collar workers, on the basis of the information received in n. , p. above. To estimate the sizes of the frequent and moderate user distributions, we arbitrarily divided the remainder of the total population between these two categories in about a 2.5 to 1 ratio. We set the means of the infrequent and frequent user distributions at 0.01 and 0.80 respectively, and we specified relative accumulations of 1.14 and 1.11, and 1.99 for the total, frequent, and infrequent user distributions respectively. The remaining cumulation parameters were then calculated by subtraction.

[1]The discrete probabilities which are initially generated do not exactly reproduce the beta function. When this results in the average audience of a medium being different from the value specified, the simulation makes appropriate adjustments to the discrete probabilities.

as to reproduce the cell means that had already been specified for the medium.

The allocation procedure which is embodied in the simulation computer program was designed to satisfy two requirements: First, the number of exposure probabilities allocated to any cell for a given medium must equal the population size for the cell. Second, the average value of the allocated probabilities must equal the medium's cell mean.[1] In Chapter II we described the random assignment procedure which was developed to meet these requirements (pp.).

Table 4.39 lists the marginal percentage breakdown, on each cell-defining dimension, produced by this random assignment procedure in the sample computer audience of each simulated medium.[2] For each all-Union print medium in the simulation the table also shows the

---

[1]This procedure does not reproduce, exactly, the cell means derived from audience data in the first part of the simulation. The reader will recall, however, that these means are produced by the Mosteller technique, and are themselves only estimates of the empirical values. Also, in most simulation runs one is not likely to analyze the output for single cells (unless they are very large), but rather for groups of cells, and the larger the number of probabilities in a cell or group of cells, the more likely is the random assignment procedure described in Chapter II to reproduce closely the mean exposure probability specified for that subpopulation.

[2]For the oral agitation medium, the percentage breakdowns were as follows:

Sex		Age			Education				Political Involvement		Residence	
Male	Female	16-29	30-45	50+	<4	$\geq 4, <7$	$\geq 7, \leq 10$	>10	Party	Non-Party	Urban	Rural
65.1	34.9	35.1	24.9	4.0	44.9	35.1	18.1	1.9	2.1	97.9	67.9	32.1

Table 4.39--Marginal percentage breakdowns, on cell-defining dimensions, produced by the random assignment procedure (and the Mosteller technique) in the sample computer audience of each simulated medium.

Title or Type	Male	Female	16–29	30–49	50+	<4	≥4,<7	≥7,≤10	>10	Party Member	NonParty Member	Urban	Rural
	PERCENTAGE MARGINAL												
All-Union Newspapers													
Pravda	39.3 (39.1)	60.7 (60.9)	42.2 (42.3)	33.1 (33.2)	24.7 (24.5)	16.8 (16.9)	31.3 (31.2)	32.8 (32.9)	19.1 (19.0)	17.2 (17.0)	82.8 (83.0)	67.4 (63.3)	32.6 (32.7)
Izvestia	41.7 (41.8)	58.3 (58.2)	45.1 (45.0)	28.3 (28.3)	26.6 (26.7)	22.4 (22.4)	23.8 (23.8)	43.8 (43.6)	10.0 (10.2)	11.7 (11.8)	88.3 (88.2)	63.6 (63.7)	36.4 (36.3)
Trud	65.1 (65.3)	34.9 (37.7)	40.2 (40.1)	27.8 (27.9)	32.0 (32.0)	35.7 (36.4)	44.1 (43.3)	15.1 (15.2)	5.1 (5.1)	8.1 (8.0)	91.9 (92.0)	69.0 (70.0)	31.0 (30.0)
Komsomolskaya pravda	73.0 (72.9)	27.0 (27.1)	89.0 (89.0)	1.0 (1.0)	10.0 (10.0)	7.2 (7.3)	19.7 (19.9)	54.1 (54.5)	19.0 (18.3)	10.7 (10.1)	89.3 (89.9)	63.8 (63.0)	36.2 (37.0)
Literaturnaya gazeta	28.4 (28.2)	71.6 (71.8)	51.5 (51.6)	24.3 (24.3)	24.2 (24.1)	2.2 (2.1)	12.4 (12.3)	56.8 (56.9)	28.6 (28.7)	8.7 (8.7)	91.3 (91.3)	47.2 (47.2)	52.8 (52.8)
Ekonomicheskaya gazeta	39.1 (38.8)	60.9 (61.2)	41.9 (41.8)	33.2 (33.3)	24.9 (24.9)	16.8 (16.7)	30.6 (30.2)	33.1 (33.5)	19.5 (19.6)	15.0 (15.1)	85.0 (84.9)	67.3 (67.1)	32.7 (32.9)
Selskaya zhizn	67.8 (67.5)	32.2 (32.5)	35.3 (35.6)	30.2 (30.4)	34.5 (34.0)	35.0 (35.0)	45.0 (45.0)	15.1 (15.1)	4.9 (4.9)	6.0 (6.1)	94.0 (93.9)	30.0 (30.0)	70.0 (70.0)

Table 4.39--Continued

Title or Type	Male	Female	16-29	30-49	50+	<4	≥4,<7	≥7,≤10	>10	Party Member	NonParty Member	Urban	Rural
	Percentage Marginal												
	All-Union Newspapers and Magazines												
Nedelya	41.8 (41.8)	58.2 (58.2)	45.1 (45.0)	28.3 (28.4)	26.6 (26.6)	22.4 (22.4)	23.7 (23.8)	43.7 (43.6)	10.2 (10.2)	11.7 (11.7)	88.3 (88.3)	63.6 (63.7)	36.4 (36.3)
Krasnaya zvezda	98.3 (98.5)	1.7 (1.5)	20.0 (19.9)	34.9 (34.9)	45.1 (45.2)	4.6 (4.3)	30.1 (30.2)	40.1 (40.2)	25.2 (25.3)	90.2 (90.4)	9.8 (9.6)	45.1 (45.3)	54.9 (54.7)
All Others Published 2/Week	42.2 (42.3)	57.8 (57.7)	52.2 (52.2)	24.6 (24.6)	23.2 (23.2)	3.0 (3.1)	13.6 (13.5)	60.7 (60.7)	22.7 (22.7)	13.0 (13.1)	87.0 (86.9)	61.8 (61.9)	38.2 (38.1)
All Others Published 3/Week	42.2 (42.3)	57.8 (57.7)	52.2 (52.2)	24.6 (24.6)	23.2 (23.2)	3.0 (3.1)	13.6 (13.5)	60.7 (60.7)	22.7 (22.7)	13.0 (13.1)	87.0 (86.9)	61.8 (61.9)	38.2 (38.1)
Ogonyok	40.6 (40.5)	59.4 (59.5)	33.9 (34.0)	28.5 (28.6)	37.6 (37.4)	8.3 (8.2)	46.5 (46.6)	40.6 (40.6)	4.6 (4.6)	1.8 (1.8)	98.2 (98.2)	49.6 (49.6)	50.4 (50.4)
Krokodil	29.1 (29.2)	70.9 (70.8)	6.2 (6.2)	41.1 (41.0)	52.7 (52.8)	4.1 (4.1)	37.6 (37.6)	49.7 (49.6)	8.6 (8.7)	6.6 (6.5)	93.4 (93.5)	55.2 (55.1)	44.7 (44.9)

Table 4.39--Continued

Title or Type	Percentage Marginal												
	Male	Female	16-29	30-49	50+	<4	≥4,<7	≥7,≤10	>10	Party Member	NonParty Member	Urban	Rural
	Republic Newspapers												
Sovietskaya Rossia	56.3	43.7	25.4	47.4	27.2	12.3	30.7	56.1	0.9	2.5	97.5	57.4	42.6
Kazakhstan Party-Govt.Papers	56.6	43.4	28.2	35.2	36.6	19.1	27.8	52.3	0.8	2.1	97.9	47.7	52.3
Central Asian Party-Govt.Papers	61.3	38.7	27.4	42.9	29.7	37.8	12.6	49.1	0.5	1.5	98.5	36.1	63.9
Transcaucasian Party-Govt.Papers	58.8	41.2	28.3	42.4	29.3	20.7	17.1	61.0	1.2	2.4	97.6	51.1	48.9
Baltic Party-Govt.Papers	57.5	42.5	22.1	43.5	34.4	5.9	38.1	55.1	0.9	0.8	99.2	51.7	48.3
European Party-Govt.Papers	57.1	42.9	26.8	49.2	24.0	12.3	30.5	56.3	0.9	0.1	99.9	44.7	55.3

Table 4.39--Continued

Title or Type	Percentage Marginal												
	Male	Female	16–29	30–49	50+	<4	≥4,<7	≥7,≤10	>10	Party Member	NonParty Member	Urban	Rural
Republic Newspapers													
All Komsomol Papers Published 3/Week	60.7	39.3	83.7	1.8	14.5	15.1	25.1	59.6	0.2	1.0	99.0	43.4	56.7
All Komsomol Papers Published 5/Week	60.7	39.3	83.7	1.8	14.5	15.1	25.1	59.6	0.2	1.0	99.0	43.4	56.7
All Others Published 1/Week	56.3	43.7	25.4	47.5	27.1	12.2	30.5	56.4	0.9	2.1	97.9	52.3	47.7
All Others Published 2/Week	56.3	43.7	25.4	47.5	27.1	12.2	30.5	56.4	0.9	2.1	97.9	52.3	47.7
All Others Published 3/Week	56.3	43.7	25.4	47.5	27.1	12.2	30.5	56.4	0.9	2.1	97.9	52.3	47.7
All Others Published 5/Week	56.3	43.7	25.4	47.5	27.1	12.2	30.5	56.4	0.9	2.1	97.9	52.3	47.7

Table 4.39--Continued

Title or Type	Percentage Marginal												
	Male	Female	16–29	30–49	50+	<4	≥4,<7	≥7,≤10	>10	Party Member	NonParty Member	Urban	Rural
SubRepublic Newspapers													
All Komsomol Papers Published 3/Week	41.3	58.7	85.6	1.6	12.8	15.1	24.9	58.0	2.0	1.7	98.3	33.8	66.3
All Others Published 1/Week	38.3	61.7	33.0	43.4	23.6	18.6	23.1	49.2	9.1	3.6	96.4	40.8	59.2
All Others Published 2/Week	38.3	61.7	33.0	43.4	23.6	18.6	23.1	49.2	9.1	3.6	96.4	40.8	59.2
All Others Published 3/Week	38.3	61.7	33.0	43.4	23.6	18.6	23.1	49.2	9.1	3.6	96.4	40.8	59.2
All Others Published 4/Week	38.3	61.7	33.0	43.4	23.6	18.6	23.1	49.2	9.1	3.6	96.4	40.8	59.2
All Others Published 5/Week	38.3	61.7	33.0	43.4	23.6	18.6	23.1	49.2	9.1	3.6	96.4	40.8	59.2
All Others Published 6/Week	38.3	61.7	33.0	43.4	23.6	18.6	23.1	49.2	9.1	3.6	96.4	40.8	59.2

Table 4.39--Continued

	Percentage Marginal												
	Male	Female	16–29	30–49	50+	<4	≥4, <7	≥7, ≤10	>10	Party Member	NonParty Member	Urban	Rural
RADIO													
Early Morning Central (5:30-8:29 a.m.)	27.1	72.9	44.5	24.1	31.4	33.2	30.5	32.3	4.0	8.0	92.0	61.5	38.5
Lunchtime Central (noon-2:59 p.m.)	53.9	46.1	22.2	39.6	38.2	33.1	30.9	34.1	1.9	3.7	96.3	50.8	49.2
Early Evening Central (6:00-9:29 p.m.)	36.3	63.7	39.1	26.5	34.4	31.3	28.9	36.5	3.3	5.7	94.3	56.4	43.6
Late Evening Central (9:30 p.m.-5:29 a.m.)	28.1	71.9	39.5	32.5	28.0	30.7	28.7	37.7	2.9	2.4	97.6	36.5	63.5
Early Morning Regional (5:30-8:29 a.m.)	44.1	55.9	24.8	40.0	35.2	33.7	29.4	34.8	2.1	1.4	98.6	42.7	57.3
Lunchtime Regional (noon-2:59 p.m.)	31.6	68.4	33.6	47.2	19.2	20.2	25.2	46.3	8.3	4.3	95.7	42.1	57.9
Early Evening Regional (6:00-9:29 p.m.)	30.9	69.1	49.6	31.3	19.1	29.4	24.5	41.5	4.6	3.5	96.5	54.4	45.6

Table 4.39--Continued

	Male	Female	16-29	30-49	50+	<4	≥4,<7	≥7,≤10	>10	Party Member	NonParty Member	Urban	Rural
	Percentage Marginal												
	Radio and Television												
Late Evening Regional (9:30 p.m.-5:29 a.m.)	19.8	80.2	40.1	17.5	42.4	42.7	19.4	32.4	5.5	7.8	92.2	48.2	51.8
Midmorning (8:30-11:59 a.m.)	16.3	83.7	45.3	33.2	21.5	20.4	25.7	47.3	6.6	4.7	95.3	76.1	23.9
Afternoon (3:00-5:59 p.m.)	16.3	83.7	45.3	33.2	21.5	20.4	25.7	47.3	6.6	4.7	95.3	76.1	23.9
Daytime Central (11:00 a.m.-5:59 p.m.)	16.3	83.7	45.3	33.2	21.5	20.4	25.7	47.3	6.6	4.7	95.3	76.1	23.9
Nighttime Central (6:00 p.m.-midnight)	23.9	76.1	40.6	38.4	21.0	27.1	37.8	30.1	5.0	9.2	90.8	80.0	20.0
Daytime Regional (11:00 a.m.-5:59 p.m.)	16.3	83.7	45.3	33.2	21.5	20.4	25.7	47.3	6.6	4.7	95.3	76.1	23.9
Nighttime Regional (6:00 p.m.-midnight)	29.7	70.3	45.6	37.1	17.3	26.4	24.4	45.2	4.0	2.0	98.0	65.5	34.5

Table 4.39--Continued

	Percentage Marginal												
	Male	Female	16-29	30-49	50+	<4	≥4,<7	≥7,≤10	>10	Party Member	NonParty Member	Urban	Rural
Foreign Radio													
Early Morning VOA (4:00-7:59 a.m.)	67.2	32.8	64.9	23.1	12.0	10.1	18.1	33.9	37.9	5.6	94.4	51.9	48.1
Daytime VOA (8:00 a.m.-7:59 p.m.)	67.2	32.8	64.9	23.1	12.0	10.1	18.1	33.9	37.9	5.6	94.4	51.9	48.1
Nighttime VOA (8:00 p.m.-3:59 a.m.)	67.2	32.8	64.9	23.1	12.0	10.1	18.1	33.9	37.9	5.6	94.4	51.9	48.1
Early Morning BBC (4:00-7:59 a.m.)	56.8	43.2	54.1	24.0	21.9	10.1	19.9	30.1	43.9	6.2	93.8	57.3	47.7
Daytime BBC (8:00 a.m.-7:59 p.m.)	56.8	43.2	54.1	24.0	21.9	10.1	15.9	30.1	43.9	6.2	93.8	52.3	47.7
Nighttime BBC (8:00 p.m.-3:59 a.m.)	56.8	43.2	54.1	24.0	21.9	10.1	15.9	30.1	43.9	6.2	93.8	52.3	47.7
Early Morning RL (4:00-7:59 a.m.)	36.3	63.7	64.1	25.8	10.1	10.8	25.1	28.2	35.9	11.5	88.5	55.3	44.7
Daytime RL (8:00 a.m.-7:59 p.m.)	36.3	63.7	69.1	25.8	10.1	10.8	25.1	28.2	35.9	11.5	88.5	55.3	44.7
Nighttime RL (8:00 p.m.-3:59 a.m.)	36.3	63.7	64.1	25.8	10.1	10.8	25.1	28.2	35.9	11.5	88.5	55.3	44.7

corresponding marginal percentage breakdowns which had earlier been produced by the Mosteller technique. It can be seen that the two sets of print marginals are virtually identical on each dimension. (A similar result was obtained for the other media in the simulation as well.)

Thus, after having processed the cumulation data for Soviet audiences, we had, for each simulated medium, probabilities of exposure assigned to each cell of the sample computer population in such a way that the estimated empirical audience marginals were closely reproduced. However, the exposure probabilities had not yet been assigned to specific individuals within the population cells. In making this assignment we had to account for the audience overlaps or duplications between media. The following section describes how the magnitudes of these duplications were estimated.

Establishing Joint Distributions of Soviet Audiences Within Demographic and Social Strata of the Sample Computer Population: The Problem of Duplication

As we mentioned earlier, there are several ways in which the simulation structures the base population in the computer. The first of these involves the specification and cell by cell assignment of exposure probabilities for individual media. This results in some people being almost constantly exposed, others almost never exposed, and still others only occasionally exposed. For any medium these three subgroups are fashioned in such a way as to produce net and cumulative audiences which just equal the corresponding figures derived from survey data and other considerations. A second important way the simulation structures the sample computer population is through the specification of duplications among media audiences.

In Chapter II we showed how nonrandom duplications among media audiences (i.e., other than chance duplications) are often accounted for, either in whole or in part, by the demographic and social distributions of those audiences. Such duplications are automatically reproduced by the simulation through the assignment of cell means, i.e., through the assignment of mean probabilities of exposure to each audience type for each medium. To reproduce duplications which are not wholly accounted for by cell-defining variables, however, the simulation must jointly assign the media's probabilities <u>nonrandomly</u> within cells. In Chapter II we described the assignment procedure developed for this purpose (pp.).

We did not know how much of the audience duplication among Soviet media was accounted for by demographic and social factors and how much was due to other factors which were not specified as dimensions of the simulation population. However, the simulation is programmed to compare each empirical audience duplication it is given with the duplication which would be produced between the two media by the random assignment of exposure probabilities within cells. Depending on the magnitude of the difference between these two figures, the simulation does or does not make a nonrandom assignment of probabilities. Accordingly, in the Soviet case we simply specified empirical audience duplications among those media for which such estimates were possible. The simulation then performed nonrandom within-cell assignments as required.

We had no direct empirical measurement of the duplications among Soviet media audiences in 1962-63. Accordingly, we were forced to rely on some broad structural characteristics of the Soviet media system (about which we did have information) for our duplication estimates. For example, readership duplications between the all-Union and the Republic level newspaper media in the simulation were established on the basis of a hypothesis for which Rogers has found strong support: that there exists a substantial degree of complementarity between all-Union and Russian language regional newspapers, with language (i.e., use of Russian) as the intervening variable. In 1962-63 this complementary relationship was probably strongest on the Republic and Autonomous Republic levels, due to the fact that the higher the level of the regional newspapers, the greater was their similarity with the central newspapers--with respect to authoritativeness, the types of specialized newspapers available, the range of content covered, the size of the circulation, and the periodicity.[1] To reflect this structural feature of the Soviet

[1]Rogers hypothesized that regional newspapers were not distributed independently of central newspapers, but rather that they complemented central newspapers--the ratio of central to regional newspapers varying from republic to republic in such a way as to bring about a total volume distributed more evenly per capita over republics than the volume of regional papers alone. The intervening variable

media system in the simulated newspaper readerships we arbitrarily set duplication between the all-Union and the Republic newspaper media at one-third of the value of the chance duplication (i.e., one-third of the produce of the readership means). The resulting pairwise duplications are shown in Table 4.40.

Readership duplications among the Republic level newspaper media in the simulation were established on the basis of the following conditions which prevailed in 1962-63:

--In the case of every Soviet republic, a high percentage of the regional newspapers were printed in the language of the basic nationality of that republic. As a result, this segment of the press did not have a large potential audience outside the republic.

--Russian language newspapers were printed in every republic, so that an individual had no need to try to obtain, for reasons of language, a Russian newspaper from another republic. (In addition, every republic received some part of the central press, which, of course, appeared only in Russian.)

---

which she found best accounted for the variation in the ratio of central to regional papers was language--the extent to which Russian was used in a republic as compared with the language of the basic republic nationality and other minority languages. For nonRussian readers in a republic the most authoritative newspapers available were the Republic or Autonomous Republic newspapers in the nationality or in a minority language, while a reader of Russian had a choice between Republic and all-Union newspapers. Accordingly, Rogers hypothesized that most of the substitution of regional for central papers occurred on the Republic and Autonomous Republic levels. In support of this hypothesis she found a significant negative correlation between the extent of use of Russian in a republic and the amount of Republic and Autonomous Republic level newspapers available in that republic, but no significant correlation between the use of Russian and the availability of lower level papers ("The Soviet Audience," pp. 37-49).

Table 4.40--Estimated empirical readership duplications between pairs of simulated all-Union and Republic level newspapers.[a]

Republic Level Title or Type	All-Union Title or Type: Pravda	Izvestia	Komsomolskaya pravda	Trud	Literaturnaya gazeta	Selskaya zhizn	Nedelya	All Others Published 2/Week	All Others Published 3/Week
Sovietskaya Rossia	0.16%[b]	0.12%	0.09%	0.00%	0.00%	0.08%	0.00%	0.07%	0.00%
Central Asian Party-Govt.	0.09	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Transcaucasian Party-Govt.	0.08	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Baltic Party-Govt.	0.09	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00
European Party-Govt.	0.18	0.13	0.10	0.00	0.00	0.08	0.00	0.08	0.00
All Komsomol Published 5/Week	0.09	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00
All Others Published 1/Week	0.14	0.11	0.08	0.00	0.00	0.07	0.00	0.06	0.00

Table 4.40--Continued

[a]Duplications were specified only for newspapers with average readerships in excess of 3 million persons. In all other cases the difference between chance and one-third chance duplication (less than 0.1% of the population) was regarded as negligible. To estimate the chance duplication values we assumed a readership mean for each central paper, in each of the six territorial units, which was the same as the overall readership mean for the central paper.

[b]The percentages are based on the total adult 1962-63 Soviet population.

--The press on each territorial-administrative level paid particular attention to the problems which were "local problems" at that level. It would therefore have been far more interesting to persons living in the territorial unit to which it was directed than to anyone else.

--Among Comcom Leisure Study respondents only one reported having read a regional newspaper from a republic other than that of his residence.[1]

On the basis of these findings we concluded that, in 1962-63, newspapers printed in one republic were distributed only in that republic and nowhere else, and that, as a result, a resident of a given Soviet republic had access to the centrally published press, and the press published in the republic in which he lived, but was virtually without access to the other regional press. Accordingly, we specified zero duplications between the readerships of the Republic level newspaper media in the simulation, as indicated in Table 4.41.

Based on reasons analogous to those outlined above for all-Union and Republic level newspapers, we also set audience duplications between the central and the regional radio media, and the central and the regional TV media, in the simulation at one-third of the random values.[2] Table 4.42 shows these duplications, and Table 4.43

---

[1] Rogers, "The Soviet Audience," p. 35.

[2] The language factor probably plays an important role with the electronic as well as with print media. Because of the comparatively greater difficulty of comprehending the spoken versus the written word, a language used in newspaper exposure is used also in radio exposure. As far as the choice of the language of exposure to television is a decision by the audience, this choice probably follows the same pattern as in the case of radio, since both media rely on comprehension of the spoken word.

Table 4.41.--Estimated empirical readership duplications between pairs of simulated Republic level newspapers.

	TITLE OR TYPE					
Title or Type	Sovietskaya Rossia	Kazakhstan Party-Govt.	Central Asian Party-Govt.	Transcaucasian Party-Govt.	Baltic Party-Govt.	European Party-Govt.
Sovietskaya Rossia	4.0%*	0.0%	0.0%	0.0%	0.0%	0.0%
Kazakhstan Party-Govt.	0.0	0.7	0.0	0.0	0.0	0.0
Central Asian Party-Govt.	0.0	0.0	2.2	0.0	0.0	0.0
Transcaucasian Party Govt.	0.0	0.0	0.0	2.1	0.0	0.0
Baltic Party Govt.	0.0	0.0	0.0	0.0	2.2	0.0
European Party Govt.	0.0	0.0	0.0	0.0	0.0	4.4

*The percentages are based on the total adult 1962-63 Soviet population. Each nonzero value simply represents the average readership of the given newspaper medium.

Table 4.41.--continued

*The percentages are based on the total adult 1962-63 Soviet population. Each nonzero value simply represents the average readership of the given newspaper medium.

Table 4.42--Estimated empirical audience duplications between simulated central and regional radio media and simulated central and regional TV media.

	Central Medium					
Regional Medium	Early Morning Radio	Lunchtime Radio	Early Evening Radio	Late Evening Radio	Daytime TV	Nighttime TV
Early Morning Radio	3.3%[a]	5.5%	5.9%	2.4%	--[b]	--
Lunchtime Radio	0.5	0.9	1.0	0.4	--	--
Early Evening Radio	1.1	1.9	2.1	0.8	--	--
Late Evening Radio	0.5	0.9	0.9	0.4	--	--
Daytime TV	--	--	--	--	0.0	0.1
Nighttime TV	--	--	--	--	0.2	1.4

[a]The percentages are based on the total adult 1962-63 Soviet population.

[b]No duplications were specified between radio and television media.

Table 4.42.--continued

[a] The percentages are based on the total adult 1962-63 Soviet population.

[b] No duplications were specified between radio and television media.

Table 4.43--Estimated empirical audience duplications between simulated foreign radio media.[a]

Medium	Medium: Nighttime VOA	Nighttime BBC	Nighttime RL
Nighttime VOA	20.4%[b]	13.9	14.1
Nighttime BBC	13.9	11.5	7.9
Nighttime RL	14.1	7.9	11.7

[a]Duplications were specified only for foreign radio media with average audiences in excess of 3 million persons, because the difference between chance and three times chance duplication was insubstantial otherwise.

[b]The percentages are based on the total adult 1962-63 Soviet population. Each nonzero value simply represents the average audience of the given medium.

displays the overlapping audiences which resulted from specifying three times the chance duplication between the audiences of the different foreign radio stations represented in the simulation. (We based the latter figure on the far from complete penetration of the Soviet population with radio sets having short wave bands).

Secondary sources analyzed in the course of the Comcom project contained almost no information with regard to audience duplications between the five basic media types conceptualized in the simulation--newspapers, magazines, radio, TV, and foreign radio. However, there was little reason to believe that such duplications were not rather well explained by the exposure-related demographic and social characteristics of the audiences, rather than by factors which were not considered in defining the sample population. Therefore, we did not attempt to derive estimates of the empirical audience duplications between different types of media.

CHAPTER V

DISTRIBUTING SOVIET MESSAGE-RESPONSE CHARACTERISTICS OVER SAMPLE COMPUTER AUDIENCES

CHAPTER V

DISTRIBUTING SOVIET MESSAGE-RESPONSE CHARACTERISTICS OVER SAMPLE COMPUTER AUDIENCES

Introduction

The simulation up to this point had assigned each individual in the computer population probabilities of exposure to each of the fifty-six media conceptualized in the model. However, this description of the Soviet population in terms of its media-consumption habits was only a precondition for simulating the exposure of the population to media messages associated with the Cuban missile crisis and the assassination of President Kennedy. Before we could simulate exposure to messages, we also had to describe the Soviet population in terms of its message-response characteristics. This meant that we had to provide the simulation with aggregate theme- and format-response data which it could use to estimate each simulated individual's average probability of exposure to each message type in the two scenarios, given that he was exposed to the medium which carried the given type of message. The simulation could then compute an individual's exposure to a message in a medium as the product of his probability of exposure to the medium and his conditional probability of exposure to the message.

In Chapter III we showed how the simulation uses aggregate theme- and format-response data provided by the researcher, to compute conditional message exposure probabilities. We now proceed to describe how the required theme- and format-response parameters were estimated for Soviet audiences.

Soviet Newspaper and Magazine Audiences

Theme-response characteristics

The simulation programs require aggregate theme-response data summarized in terms of ratios of average theme-exposure probabilities on adjacent levels of one or more population dimensions. Thus, for newspapers (and magazines) we had to specify information of the following kind: the relative likelihood of men versus women being exposed to articles on international affairs, the relative likelihood of Party members versus nonParty members being exposed, etc. Because of the paucity of this type of data for Soviet audiences, it was necessary to treat each individual theme in the Cuban crisis and Kennedy assassination scenarios as part of the broader theme of international affairs, in order that we might specify one set of ratios of average theme-exposure probabilities for all themes and print media in the two scenarios.

Our only source of theme-response data for Soviet newspaper readers was a reading experiment conducted by Rogers with thirty-nine of the respondents who had been given the Comcom Leisure Study interview and with two other former Soviet residents (who would also have qualified for the interview). The aim of this experiment, which covered six issues of Pravda and four issues of Izvestia dating from November 1964 to May 1965, was to determine who in the Soviet newspaper audience was reached by the most significant and authoritative material in those issues, and to learn what techniques Soviet readers employed to extract information from such material. We have used the data from this study to estimate relative likelihoods of news readership on adjacent levels of each dimension of the simulation population.

The portion of the reading experiment with which we were concerned was conducted in the following manner. Each respondent was shown the ten newspapers in a random sequence and asked to identify all the articles that he "would have read if he had been reading such an issue of Pravda or Izvestia while in the Soviet Union."[1] Due to the way in which the experiment was structured, the respondents made their decision on whether they "would have read" a given article or not essentially on the basis of the title and the format of the

[1]We note here that the definition and data used in generating average theme-exposure probabilities for newspapers, and for the other media types in the simulation as well, refer to the chance that a member of the audience of a medium would have been exposed to and will recall that he would have been exposed to, a given type of message in a given Soviet medium, even though a significant period of time has elapsed since he last was exposed to that medium in a natural situation. (Rogers reports that this type of question did not seem to disturb respondents.) Therefore, the exposures which are output from the simulation are really, in the Soviet case, estimates of aided recall several years after the appearance of the medium.

article, and the place in the newspaper at which the article appeared. What they were asked about, then, was essentially whether they would have begun to read a certain article; not, how closely they would have read it, or whether they would have finished reading it.[2]

The data from this segment of the forty-one interviews were recorded in the following form: For each article in each of the ten newspapers--the title and date of the issue, and the ID number of each respondent followed by a plus or minus depending on whether he would or would not have read the article. Unfortunately, not every respondent was shown all four (or six) pages in each newspaper. If there were time constraints, only two or three pages were shown. Also, the experimenter recorded some respondents' choices only among ten articles in which she was particularly interested.[3] As a result, the proportion of the forty-one respondents who were shown an article varied significantly from one article to the next, and in no case was it very large. Accordingly, we chose not to use the aggregated results of the experiment as estimates of the average proportion of men, the average proportion of women, the average proportion of Party members, the average proportion of nonParty members, etc., who would have read an article if they had read the paper at all. Instead, we used as rough measures of these parameters the average proportion

---

[2]A description of the experimental methodology, the hypotheses tested, and the complete results is presented in Rogers, "The Soviet Audience," Chapter VI.

[3]See p. below, n.

of all appearances of articles which would have been read by men, women, Party members, nonParty members, etc. Table 5.1 shows the estimated average and relative theme-exposure probabilities which resulted, on each dimension of the simulation population, from this estimation procedure.

We note several limitations with regard to these estimates. First, the stories used in the reading experiment came only from two papers, Pravda and Izvestia, and from issues published in 1964 and 1965. Thus, we cannot be certain that the news articles in these ten issues were truly representative of the news articles that appeared in the Soviet press during the periods following the Cuban missile crisis and the assassination of President Kennedy. Two other factors which bear on the validity of the estimates in Table 5.1 relate to the content of the newspaper articles and the composition of the sample used in the reading experiment.

Data from the reading experiment are based on a total of 179 newspaper articles from the 10 issues referred to above. These articles dealt not only with international affairs but with a range of domestic subjects as well. Unfortunately, it was not possible to base our estimates of average theme-exposure probabilities on the data pertaining only to international news stories, because the numbers involved would have been too small to yield reliable values.

A third compromising factor is the makeup of the sample used in the reading experiment. As can be seen in Table 5.2, among the forty-one respondents interviewed, urbanites, the well educated, and

Table 5.1--Estimated average and relative probabilities of exposure to a newspaper news article on each dimension of the simulated Soviet population.

Dimension	Average Theme-Exposure Probability	(N)[a]	Ratio
Sex			
Male	0.308	(2,122)	
Female	0.237	(1,263)	1.30
Age			
16-29	0.344	(1,478)	
30-49	0.257	(1,577)	1.34[c]
50+	0.118	(330)	2.18[c]
Education			
<4 yrs.	0.030[b]	(--)	
≥4, <7 yrs.	0.039	(153)	0.76[d]
≥7, ≤10 yrs.	0.239	(1,075)	0.16[d]
>10 yrs.	0.320	(2,157)	0.75[d]
Political Involvement			
Party Member	0.416	(327)	
Non Party Member	0.267	(3,058)	1.56
Residence			
Urban	0.281	(2,957)	
Rural	0.287	(428)	0.98

[a]Total number of article-respondent pairs on the basis of which the calculations were made.

[b]An extrapolated value, since persons with less than four years of education were not represented in the sample.

[c]In the simulation runs these values caused message audience substantially greater than the media audiences in some cells, for some message formats. Accordingly, these ratios had to be changed to 1.10 and 1.60 respectively. For a detailed explanation of the relationship between format factors and relative theme-exposure probabilities the reader is referred to Chapter III, p.

[d]In the simulation these values had to be changed to 0.80, 0.60, and 0.80 respectively, for the reasons indicated in note b above.

Table 5.2--Marginal percentage breakdown, on five dimensions, of the Comcom reading experiment sample, the Leisure Study sample, and the adult population of the Soviet Union as described by the 1959 census.

Dimension	Reading Experiment Sample (N=41)	Leisure Study Sample (N=107)	Soviet Population (N=145,331,288)
Sex			
Male	73	70	42
Female	27	30	58
Age			
16-29	46	36	36
30-49	42	44	37
50+	12	20	27
Education			
<4 yrs.	0	0	34
≥4, <7 yrs.	5	12	28
≥7, ≤10 yrs.	34	48	34
>10 yrs.	61	40	4
Political Involvement			
Party Member	15	10	6
Non Party Member	85	90	94
Residence			
Urban	85	79	50
Rural	15	21	50

males were even more overrepresented than in the parent Leisure Study sample. For simulation purposes, however, we were prepared to assume that this source of bias, as well as the other sources mentioned above, had a much stronger effect on individual estimates of average theme-exposure probabilities than on the ratios of these estimates. Accordingly, we used the ratios shown in Table 5.1 for each of the themes in the Cuban crisis and Kennedy assassination scenarios.[1]

---

[1] If Soviet newspaper readers are at all comparable to readers in this country, then some support for the validity of the relative values estimated for the sex dimension comes from a study done by Swanson which summarizes the results of the Advertising Research Foundation's Continuing Study of Newspaper Reading, a source we cited earlier in connection with newspaper cumulation data. Swanson found the following average and relative readership figures for articles dealing with general international news:

Category of Article	Dimension Level	Average Theme-Exposure Probability	Ratio
War	Male	0.394	
News	Female	0.298	1.34
Defense	Male	0.308	
News	Female	0.274	1.37
Economic-Social International	Male	0.221	
Relations News	Female	0.181	1.27

(Charles E. Swanson, "What They Read in 130 Daily Newspapers," Journalism Quarterly, XXXII (Fall, 1955), 411-21, cited by Kramer, "A Computer Simulation," p. .)

Format-response characteristics

To compute conditioned message exposure probabilities the simulation programs require not only aggregate theme-response data, but aggregate format-response data as well. The latter had to be summarized in terms of "attractiveness" factors for differently formatted messages in each simulated medium. For newspapers (and magazines) we therefore had to specify information of the following kind: the average proportion of readers of an issue exposed to an editorial on international affairs, the average proportion exposed to a short news item on international affairs, etc.[5]

The reading experiment conducted with Comcom Leisure Study respondents also served as our basic source of format-response data for Soviet newspaper readers. The 179 stories which appeared in the 10 newspapers were coded not only for content but also for two format characteristics. One set of format variables referred to the

---

[5]In Chapter III we explained how the simulation programs were designed so that a researcher would have the option of specifying format factors which had one of two possible meanings: (1) the average proportion of a medium's audience exposed to the theme in the given format, divided by the average proportion exposed to the theme in all possible formats; (2) the average proportion of a medium's audience exposed to the theme in the given format. The reader will note that we exercised the second option. Thus, when we specified ratios of average theme-exposure probabilities on each population dimension, we also specified 1.0 as the average proportion of a medium's audience exposed to each theme in its most attractive format. This was done so that the simulation would correctly normalize the format factors which we had specified. The reader is referred to Chapter III, pp. , for a detailed description of the relationship between format factors and average theme-exposure probabilities.

page location of the story (the coding was therefore 1, 2, 3, 4, 5, or 6), and the other to the type of article or mode in which the story appeared. The categories in this latter set were: (1) editorial, (2) short news item, (3) announcement, (4) speech, (5) telegram or letter, (6) slogan, (7) long news article, (8) long commentary, (9) photograph, (10) cartoon.

For the same reasons that were outlined above, we could not use the results of the reading experiment as estimates of the average proportion of readers of a Soviet newspaper who would have been exposed to an article in a given format if they had read the paper at all. Moreover, because of the small numbers involved, we could not use the readership data to estimate factors for sixty different article formats, cross-classified by page location <u>and</u> type or mode. Instead, we chose to aggregate the readership response data over page locations and use as estimates of format factors the average proportion of all editorials, short news items, announcements, etc., on international affairs which would have been read by members of the Soviet newspaper/audience. Before we could do this, however, we had to develop a computational procedure to account for a potentially important source of variation in the values of these format factors from one newspaper audience to another.

The reader will recall that frequency of regular exposure to newspapers, and the number of newspapers to which regular exposure was reported, increased with increasing education and political involvement in the Leisure Study sample. Similarly, within the reading experiment sample Rogers found that the kind and amount of "important"[6] material in authoritative Soviet newspapers to which respondents exposed themselves was significantly larger in the more educated and politically more involved groups than in the less educated and politically less involved groups. Of particular interest to us was her finding that the more educated and politically more involved tended to identify relatively more analytical, critical, and policy relevant material and less general information and propaganda material as "important" or "interesting" than did the less educated and politically less involved. This suggested that the breakdown of a newspaper's readership by education and political involvement might significantly affect the aggregate response of that readership to differently formatted articles. We speculate, for example, that difficult editorials and long analytical commentaries probably attracted larger proportions of the per issue readership on the average, in those Soviet newspapers that had the more educated and the politically more involved readers.

To account for the possibility of such variations in format response in the simulation, it was necessary to estimate for each

---

[6] In structuring the reading experiment, Rogers selected the six issues of Pravda and the four issues of Izvestia on the basis of the fact that each contained an article with analytical material in the areas of Soviet politics, economics or social relations--material that she considered "important" because of the discussion, criticisms, or policy statements it contained. Her findings with respect to the differences between the educated and politically involved and the less well educated and politically less involved are based on the readership or nonreadership of these ten articles.

print medium a set of format factors which reflected the distribution of the medium's readership by education and political involvement. Accordingly, we used the reading experiment data in the fashion described above to estimate format factors for editorials, short news items, announcements, etc., within each of the following four audience types:

Type	Education/Political Involvement[7]
1	High (>10 yrs.)/High (Party member)
2	High (>10 yrs.)/Low (NonParty member)
3	Low (≤10 yrs.)/High (Party member)
4	Low (≤10 yrs.)/Low (NonParty member)

The results are summarized in Table 5.3.

The next step was to compute a set of format factors for each print medium in the simulation. This required that we estimate the proportion of each medium's readership in each of the four categories defined above. A rationale for making these calculations was developed from Kramer's estimated breakdown of the 1959 Soviet population

---

[7]We defined "high political involvement" as it was defined in the reading experiment sample--membership in the Communist Party or, in the case of nonParty members, membership in occupational roles in which the individual is expected to be a high media consumer. Respondents who did not fall in this category were defined as having "low political involvement." Type 3 contained only one respondent and he was a Party member with a ten year education. We reassigned him to type 1 and estimated the format factors for type 3 by interpolation.

Table 5.3--Estimated proportions of four Soviet readership types exposed to differently formatted newspaper news articles.

	Format Factor				
Article Format	High Education High Political Involvement (N)[a]	High Education Low Political Involvement (N)[a]	Low Education High Political Involvement[g]	Low Education Low Political Involvement (N)[a]	All Types[h]
Slogan[b]	0.600	0.600	0.600	0.600	0.600
Editorial[c]	0.706	0.457	0.450	0.368	0.444
Long News Article/Commentary[d]	0.706 (17)	0.457 (153)	0.450	0.368 (87)	0.444
Speech	0.408 (71)	0.509 (165)	0.400	0.284 (123)	0.412
Announcement	0.600 (10)	0.408 (71)	0.400	0.250 (40)	0.372
Short News Item[e]	0.380 (231)	0.273 (1,414)	0.270	0.164 (815)	0.247
Telegram/Letter[f]	0.380	0.273	0.270	0.164	0.247
Cartoon	0.143 (7)	0.030 (37)	0.030	0.158 (19)	0.063
Photograph	0.375 (8)	0.034 (58)	0.030	0.030 (33)	0.061

Table 5.3--Continued

[a]Total number of article-respondent pairs on the basis of which the calculations were made.

[b]Based on conversations with Rogers we assumed that slogans had an average (noncrisis) format factor of 0.6 for each of the four readership types. We did not apply this factor to repeat slogans, such as the New York Times' "All the News That's Fit to Print." Such slogans, which undoubtedly have a negligible attention-getting value, were not a part of either message scenario.

[c]For editorials, the numbers in the reading experiment were so small that we could not use them to estimate format factors. Instead, we used the same values that were derived for long news articles/commentaries, since these two types of articles usually contained the most difficult reading material and because editorials attracted the highest overall audience proportion after long news articles/commentaries.

[d]"Long news articles" and "commentaries" were aggregated in the simulation content analysis because the coder had difficulty distinguishing these two types of articles. Accordingly, we only computed format factors for the aggregated type.

[e]Short news items are perhaps the most popular type of article with Soviet newspaper readers. The relatively low format factor computed for short news items probably reflects the comparatively high frequency with which they occur.

[f]For letters and telegrams, the numbers in the reading experiment were so small that we could not use them to estimate format factors. Instead, we used the same values that were derived for short news items, both because of the comparatively frequent occurrence of letters and their generally short, encapsulated format.

[g]Since there were no respondents in this readership type (see n. p.), we estimated the format factors by interpolation--basing our estimates on Rogers' hypothesis that, with regard to exposure to content within newspapers, the low education-high political involvement group would most resemble the two groups with higher education and show generally higher exposure than the low education-low political involvement group.

[h]Since there were no respondents in the low education-high political involvement readership type, the format factor shown for "all types" refers only to the other three types.

by education and class, which is reproduced below:[8]

Education	Class: White Collar (millions)	Blue Collar (millions)	Farmer (millions)	Totals (millions)
⩽10 yrs.	30.0	99.4	65.4	194.8
>10 yrs.	11.9	1.6	0.5	14.0
Totals	41.9	101.0	65.9	208.8

It seemed reasonable to assume that virtually all persons in the white collar category fell into the "high political involvement" group defined above (p. , n.), i.e., that they were either members of the Communist Party or filled occupational roles in which one could expect them to be comparatively high media consumers. Consistent with this assumption were the following two additional assumptions:

--that approximately 85 percent of those with higher education were either Party members or in occupational roles which made them media-immersed;

--that approximately 15 percent of those without higher education were either Party members or in occupational roles which made them media-immersed.

By extending these two assumptions to the readership of each print medium in the simulation, we were able to estimate the proportion of each medium's readership in each of the four audience categories--

[8]Adapted from: Kramer, "The Population of the Soviet Union," Table IV.

high education-high political involvement, etc.--for which we had already calculated format factors. For each print medium we then computed nine format factors, one for each type of article, by taking a weighted sum of the format factors in Table 5.3, where the weights were simply the estimated audience proportions in the four education-political involvement categories. Table 5.4 gives a sample of the results--for two all-Union newspapers. The format factors computed for all thirty-two simulated print media appear in Appendix A, Table A, along with a summary of the computation procedure for each medium.[9]

---

[9]It is interesting to note that wide variations in print readerships with respect to education and political involvement breakdowns only gave rise to a modest variation in the estimated format factors for given types of articles. For simulated print media with periodicities of less than 6 per week, we used just half the values of the estimated format factors on certain days of the week. The assumptions we made in this regard, which are reviewed in Appendix B, Tables B.7-B.9, may be summarized as follows:

Periodicity	Days of Publication						
5 per week	Su	Tu	W	Th	F		
		Tu	W	Th	F	Sa	proportion of estimated
	0.5	1.0	1.0	1.0	1.0	0.5	format factor used
4 per week	Tu	W	Th		Sa		
	Tu	W		F	Sa		proportion of estimated
	1.0	1.0	0.5	0.5	1.0		format factor used
3 per week	Su		W		F		
		Tu		Th		Sa	proportion of estimated
	0.5	0.5	0.5	0.5	0.5	0.5	format factor used
2 per week	Su		F				
		Tu		Sa			proportion of estimated
	0.5	0.5	0.5	0.5			format factor used
1 per week	W						
		Th					proportion of estimated
	0.5	0.5					format factor used

(continued)

Table 5.4--Estimated format factors for two simulated Soviet print media.

Article Format	Format Factors: Pravda	Format Factors: Trud
Slogan	0.685	0.622
Editorial	0.435	0.395
Long News Article/Commentary	0.435	0.395
Speech	0.325	0.307
Announcement	0.330	0.287
Short News Item	0.214	0.189
Telegram/Letter	0.214	0.189
Cartoon	0.137	0.138
Photograph	0.088	0.044

(continued)

In other words, lacking more detailed data we assumed that, for example, half the readership of an aggregated paper published 3 days a week received the paper on Monday, Wednesday and Friday, and half on Tuesday, Thursday, and Saturday. For the most likely days of publication we consulted Paul Cox, a graduate student at Harvard University who had recently visited the Soviet Union.

Soviet Radio and Television Audiences

Theme-response characteristics

As we mentioned above, to compute conditional message exposure probabilities the simulation programs require aggregate theme-response data summarized in terms of relative theme-exposure probabilities on one or more population dimensions. Thus, for radio and TV we had to specify the following kind of information: the relative likelihood of urban versus rural dwellers being exposed to broadcasts on international affairs, the relative likelihood of persons between the ages of 16 and 29 versus persons between the ages of 30 and 49 being exposed, etc. Again, because of the lack of detailed data on Soviet audience response characteristics, we treated individual themes in the two scenarios as part of one theme--"international affairs"--so that we could specify one set of relative theme-exposure probabilities for all themes carried by radio media in the two scenarios, and one set for all themes carried by TV media.

The Comcom Leisure Study served as our basic source of theme-response data for Soviet radio and television audiences. Each Leisure Study respondent was asked the following questions: "What [radio] programs, if any, did you try to listen to regularly. . . .? Give names of programs." "What [television] programs, if any, did you try to listen to regularly. . . ? Give names of programs." Respondents answered the radio question for each of seven time slots and the television question either in terms of specific times of day or for each of two time slots. (We described these time slots in Chapter IV, p.). Unfortunately, since the respondents were not presented with a checklist of program types, we could not be certain each respondent's spontaneous answers represented an exhaustive enumeration of the types of programs he attended to. In addition, the number of respondents who listened to radio or watched TV at all, and hence the number who attended to newscasts, varied significantly over the daily time slots--in some time slots being too small to provide a valid base for estimating average theme-exposure probabilities. For these reasons we chose not to use the Leisure Study data to estimate a set of average theme-exposure probabilities for each Soviet electronic medium in the simulation. Rather, we chose to aggregate the Leisure Study responses over time slots, and thereby obtained one set of estimates for all radio media and another set for all TV media. The resulting estimated average and relative theme-exposure probabilities on each population dimension are shown in Table 5.5.

Here again it is important that we note the limitations with respect to such estimates. Aside from (1) the bias of the sample, (2) the likelihood that the newscasts to which respondents said they attended referred to a much broader range of content than just international news, and (3) the possibility that the real average and relative theme-exposure probabilities varied over times of the day,

Table 5.5--Estimated average and relative probabilities of exposure to radio and television newscasts on each dimension of the simulated Soviet population.

Dimension	Radio: Average Theme-Exposure Probability (N)[a]	Radio: Ratio	Television: Average Theme-Exposure Probability (N)[a]	Television: Ratio
Sex				
Male	0.959 (73)		0.433 (30)	
Female	0.871 (31)	1.10	0.428 (21)	1.01
Age				
16-29	0.921 (38)		0.273 (22)	
30-49	0.934 (45)	0.99	0.524 (21)	0.52
50+	0.953 (21)	0.98	0.625 (8)	0.84
Education				
<4 yrs.	1.000[b]		0.500[b]	
≥4, <7 yrs.	1.000 (13)	1.00	0.500 (4)	1.00
≥7, ≤10 yrs.	0.980 (49)	1.02	0.619 (21)	0.81
>10 yrs.	0.857 (42)	1.14	0.269 (26)	2.26
Political Involvement				
Party Member	0.909 (11)		0.500 (8)	
Non Party Member	0.936 (93)	0.97	0.419 (43)	1.19
Residence				
Urban	0.927 (82)		0.445 (45)	
Rural	0.955 (22)	0.97	0.333 (6)	1.34

[a]Total number of Comcom respondents on the basis of which the calculations were made.

[b]An extrapolated value, since persons with less than four years of education were not represented in the Leisure Study sample.

there is another important factor which bears on the validity of our estimates: Lacking data on the sample members' attention to _individual_ newscasts, we assumed that the relative proportion of two subgroups attending news type programs _at all_ would serve as an approximate measure of their relative probability of exposure to an individual newscast.

Notwithstanding these qualifiers and the ones enumerated earlier for newspaper theme-exposure estimates, several features of both sets of results are worth noting. First, radio appears to rank far ahead of television and newspapers as a news medium, while TV ranks only slightly ahead of newspapers. (In fact, given the 0.9+ average exposure estimates, radio appears to serve primarily the news dissemination function.) Second, relative theme-exposure probabilities on each dimension are greatest for newspapers, smallest for radio, with the young and the well educated more likely to attend to newspaper news and the old and the less well educated more likely to attend to radio news. These patterns are all fairly consistent with what we know about the effects of literacy, income, and penetration on the relative news dissemination functions of the three major Soviet mass media.

Format-response characteristics

The manner in which we defined and estimated format factors for Soviet radio and television audiences was dictated largely by the type of aggregate format-response data available. The Leisure

Study sample again served as our principal source. We mentioned above that Comcom respondents were asked to list the kinds of radio and TV programs to which they attended. Unfortunately, since the respondents were not presented with a checklist of program types, they answered these questions broadly, in such terms as "news", "music", etc. Consequently, their answers with respect to attendance to news programs did not distinguish between different formats--straight news, press reviews, commentaries, and the like. We therefore could not use the Leisure Study data to estimate, as we had for print media. the values of factors which would reflect the relative attractiveness of different news formats.

However, we also had data on the time and place limits of availability of radio and TV newscasts. As a result, for every simulated Soviet electronic medium we were able to estimate format factors defined in the following way: the average proportion of early morning listeners exposed to an early morning radiocast on the Fourth Program, the average proportion of evening viewers exposed to an evening news telecast on the First Program, etc.[10] We now proceed to describe how these estimates were made.

The number of Comcom respondents who listened to radio or watched TV was too small during some time slots to provide stable estimates of format factors for the various times of day. Accordingly, we could not use the Leisure Study data by itself to compute

---

[10]To be sure, these estimates were averages pertaining to all news content broadcasts rather than just to international affairs newscasts, as we would have preferred.

format factors which would reflect changes in format-response within radio and TV audiences during the course of a day. Instead, we aggregated the Leisure Study responses over time slots (and presumably over different newscast formats as well), and used the results to estimate an average newscast format factor for radio and an average newscast format factor for TV, in each of three education categories: >10 years; $>7, \leq 10$ years; and ≤ 7 years. The results are summarized in Table 5.6. We then computed an average newscast format factor for each simulated radio and TV medium by taking a weighted sum of the format factors in Table 5.6, where the weights used were just the medium's estimated audience proportions in the three education categories. Table 5.7 lists these results.

It is important to note that the "average format factors" in Table 5.7 represent average proportions of radio and TV audiences exposed to newscasts at all, rather than average proportions exposed to individual newscasts. We also note that the results clearly show television ranking a distant second to radio with regard to their use as news media.[11]

---

[11]The most widespread use of the radio by Leisure Study respondents was as a news medium. The other type of program to which they reported almost as wide exposure was musical programs. Concom respondents reported a more varied diet, however, for television. The most popular TV programs with the sample members were films, followed by three program types which were mentioned with about equal frequency--musical programs, sports programs, and news/commentary. Almost all citations of news programs came from regular users of television, but even among them not more than half mentioned news as a program they typically watched. (Rogers, "The Soviet Audience," p. 119).

Table 5.6--Estimated proportions of Soviet radio and television audiences who attended to newscasts, by education.

Education	Audience Proportions			
	Radio	(N)*	Television	(N)*
>10 yrs.	0.810	(42)	0.193	(31)
>7, ≤10 yrs.	0.870	(38)	0.612	(18)
≤ 7 yrs.	0.910	(23)	0.500	(10)

*Total number of respondents on the basis of which audience proportions were calculated. Because of the uneven distribution of Party members over the education variable, we also computed the education breakdown of radio and TV newscast audiences among just the non Party members in the sample. The results, in descending order on the education variable, were as follows: Radio--0.790, 0.860, 0.910; Television--0.130, 0.612, 0.500. Since these figures did not differ much from those in the Table, we used the latter set in the simulation.

Table 5.7--Estimated average newscast format factors for the simulated Soviet electronic media.

Medium	Audience Breakdown by Education[a]			Average Format Factor[b]
	(>10 yrs.)	(>7, ≤10 yrs.)	(≤7 yrs.)	
Radio				
Early morning central (5:30-8:29 a.m.)	4.0	31.5	64.5	0.893
Lunchtime central (noon-2:59 p.m.)	1.9	25.6	72.5	0.898
Early evening central (6:00-9:29 p.m.)	3.3	27.5	69.2	0.896
Late evening central (9:30 p.m.-5:29 a.m.)	2.9	28.3	68.8	0.895
Early morning regional (5:30-8:29 a.m.)	2.0	26.0	72.0	0.897
Lunchtime regional (noon-2:59 p.m.)	8.2	34.7	57.1	0.888
Early evening regional (6:00-9:29 p.m.)	4.5	31.0	64.5	0.893
Late evening regional (9:30 p.m.-5:29 a.m.)	5.5	24.4	70.1	0.894
Midmorning (8:30-11:59 a.m.)	6.5	35.3	58.2	0.890
Afternoon (3:00-5:59 p.m.)	6.5	35.3	58.2	0.890
Television				
Daytime central (11:00 a.m.-5:59 p.m.)	4.0	35.3	60.7	0.523
Nighttime central (6:00 p.m.-midnight)	4.9	22.5	72.6	0.508
Daytime regional (11:00 a.m.-5:59 p.m.)	6.5	35.3	58.2	0.516
Nighttime regional (6:00 p.m.-midnight)	4.0	33.9	62.1	0.521

[a]The education marginals mapped into the computer audiences in Pass I.

[b]The sum of products of a medium's education marginals and the corresponding audience proportions in Table 5.6.

The next step was to convert the average format factors in Table 5.7 to individual factors for the various newscast formats defined by the possible combinations of radio or TV media (i.e., daily time slots) and Programs (First, Second, Fourth and local for radio; First, Second and local for TV). Our objective was to ensure that, of the 89 or so percent of a given radio medium's audience or the 50 or so percent of a given TV medium's audience exposed to newscasts at all, an appropriate proportion would be exposed to any _one_ newscast. Of course, this proportion had to be a function of the Program on which the newscast occurred and the number of newscasts occurring on that Program in the given medium (time slot). Thus, before individual format factors could be estimated, the following additional pieces of information were required: (1) the number of newscasts which occurred in 1962-63 in each of the medium-Program combinations; and (2) the average proportion of each medium's audience in each of the Program audiences.

We obtained the distribution of newscasts over Programs and time slots from published Soviet broadcast schedules and other schedules inferred from them for all-Union and local radio and TV Programs (see Appendix B, Tables B.10-B.14). The estimated distribution of newscasts derived from these schedules is shown in Table 5.8.

We computed an approximate average distribution of radio audiences over all-Union Programs on the basis of the distribution of the Soviet population and the distribution of receiving sets over

Table 5.8--Estimated distribution of newscasts over simulated Soviet electronic media and Programs in 1962-63

Medium	Days	Number of Newscasts: First Program	Second Program	Fourth[a] Program	Regional[b] Programs
		Radio			
Early morning central	Mon.-Fri.	4	2	4	-
(5:30-8:29 a.m.)	Sat.& Sun.	3	-	3	-
Lunchtime central	Mon.-Fri.	3	1	5	-
(noon-2:59 p.m.)	Sat.	2	1	3	-
	Sun.	2	1	4	-
Early evening central	Mon.-Fri.	5	2	5	-
(6:00-9:29 p.m.)	Sat.& Sun.	4	2	4	-
Late evening central	Mon.-Fri.	4	1	8	-
(9:30 p.m.-5:29 a.m.)	Sat.& Sun.	4	1	5	-
Early morning regional	Mon.-Fri.	-	-	-	2
(5:30-8:29 a.m.)	Sat.& Sun.	-	-	-	-
Lunchtime regional (noon-2:59 p.m.)	Mon.-Sun.	-	-	-	1
Early evening regional (6:00-9:29 p.m.)	Mon.-Sun.	-	-	-	2
Late evening regional (9:30 p.m.-5:29 a.m.)	Mon.-Sun.	-	-	-	1
Midmorning	Mon.-Fri.	3	2	3	2
(8:30-11:59 a.m.)	Sat.	2	2	2	2
	Sun.	2	1	2	1
Afternoon	Mon.-Fri.	5	-	3	-
(3:00-5:59 p.m.)	Sat.& Sun.	4	-	2	-

Table 5.8--Continued

Medium	Days	Number of Newscasts: First Program	Second Program	Fourth Program	Regional Programs
		Television			
Daytime central (11:00 a.m.-5:59 p.m.)	Mon.-Sun.	-	-	-[c]	-
Nighttime central (6:00 p.m.-midnight)	Mon.-Sun.	1	2	-	-
Daytime regional (11:00 a.m.-5:59 p.m.)	Mon.-Sun.	-	-	-	-
Nighttime regional (6:00 p.m.-midnight)	Tues.-Sat.	-	-	-	2
	Sun.& Mon.	-	-	-	1

[a]We did not represent the Fifth Program in the simulation message scenarios. This Program consisted of special broadcasts for "persons at sea," emigrés, etc.

[b]This category referred to all broadcasts not emanating in the central or all-Union level.

[c]There was no "Fourth Program" on domestic TV. A "Third Program" added in the Fall of 1963 was not represented in the simulation message scenarios on the assumption that its audience would have been negligible during November of 1963. We assumed, as indicated in the Table, virtually no news broadcasts on daytime TV in 1962-63.

Program target areas in 1962, as shown below:[12]

Target Area	Population (millions)	(% of Total)	Total Receiving Sets (Millions)	(% of Total)
First Program (USSR)	218.2	(100)	65.9	(100)
Second Program (European RSFSR)	99.8	(46)	32.9	(50)
Fourth Program (Siberia, Soviet East, central Asia)	46.4	(21)	13.0	(20)

These distributions suggested that we allocate radio audiences to Program I, II and IV in approximately the ratios 10:5:2.

We estimated the average distribution of TV audiences over all-Union Programs in the following way. First, we assumed, on the basis of published Soviet estimates, that the maximum potential television

---

[12] Population figures were taken from the 1959 all-Union census (updated linearly to 1962), broken out as follows: European RSFSR--Northwest, 11.1 million; Central, 37 million; Central South, 20.7 million; Volga Urals, 31 million. Siberia, Soviet East and Central Asia--Soviet Far East, 4 million; Lake Baikal, 3.8 million; Western Siberia, 11.6 million; Eastern Siberia, 1.8 million; Kazakh SSR, 10 million; Uzbek SSR, 9 million; Kirghiz SSR, 2.3 million; Tadzhik SSR, 2.2 million; Turkmen SSR, 1.7 million. Wire and wave set figures were calculated from the 1959 all-Union census data and people per set figures predicted from a regression equation developed by Dr. Noralou Roos from available data on the Union Republics ("Soviet Memorandum No. 9," February 1965). The receiving set figures estimated this way were incremented to match the 1962 total as follows: European RSFSR--Northwest, 3.2 million; Central, 11.6 million; Central South, 6.1 million; Volga Urals, 12.0 million. Siberia, Soviet East and Central Asia--Soviet Far East, 1.2 million; Lake Baikal, 1.3 million; Western Siberia, 4.4 million; Uzbek SSR, 2.1 million; Kirghiz SSR, 0.4 million; Tadzhik SSR, 0.3 million; Turkmen SSR, 0.4 million.

audience at the start of 1963 was about 40 million persons.[13] We estimated that the Moscow region (the target area for Program II) included about 10 million persons at that time.[14] Assuming that a relatively high percentage of the residents of this highly urbanized area were within the TV diffusion network, we concluded that the Program II audience must have been at least one fourth the size of the average audience of Program I, which was beamed to the whole USSR.

Table 5.9 shows the distributions of radio and TV audiences over all-Union and regional Programs derived from the estimation procedures outlined above.

The final step was to compute individual format factors by combining average format factors for the various radio and TV media (Table 5.7) with the estimated distribution of newscasts over media and Programs (Table 5.8) and the estimated distribution of media audiences over Programs (Table 5.9). This synthesis was achieved by means of the following algebraic procedure:

Let F = the average format factor for a given Soviet electronic medium,

N = the number of newscasts occurring in that medium on a given Program,

f = the average fraction of the Program's audience exposed to a given newscast occurring in that medium on that Program, and

---

[13]See Chapter IV, p.   , n.

[14]This estimate was based on a 1959 all-Union census figure for the Northwest area of the RSFSR (Moscow and its environs) of 10.8 million people.

Table 5.9--Estimated distribution of simulated Soviet radio and television audiences over all-Union and regional Programs in 1962-63.

Medium	First Program	Second Program	Fourth Program	Regional Programs
	Audience Proportions			
	Radio			
Early morning central (5:30-8:29 a.m.)	0.60	0.30	0.10	-
Lunchtime central (noon-2:59 p.m.)	0.60	0.30	0.10	-
Early evening central (6:00-9:29 p.m.)	0.60	0.30	0.10	-
Late evening central (9:30 p.m.-5:29 a.m.)	0.60	0.30	0.10	-
Early morning regional (5:30-8:29 a.m.)	-	-	-	1.00
Lunchtime regional (noon-2:59 p.m.)	-	-	-	1.00
Early evening regional (6:00-9:29 p.m.)	-	-	-	1.00
Late evening regional (9:30 p.m.-5:29 a.m.)	-	-	-	-
Midmorning (8:30-11:59 a.m.)	0.37	0.19	0.07	0.37
Afternoon (3:00-5:59 p.m.)	0.37	0.19	0.07	0.37
	Television			
Daytime central (11:00 a.m.-5:59 p.m.)	0.80	0.20	-	-
Nighttime central (6:00 p.m.-midnight)	0.80	0.20	-	-
Daytime regional (11:00 a.m.-5:59 p.m.)	-	-	-	1.00
Nighttime regional (6:00 p.m.-midnight)	-	-	-	1.00

Δf = the average fraction of the Program's audience exposed to a given newscast occurring in that medium on that Program, but not exposed to any other such newscast.

For computational purposes we assumed that the audience duplication between any pair of newscasts occurring in a given radio or TV medium on a given Program was greater than chance to the extent that Δf would equal $1/3(f-f^2)$. Accordingly, ignoring the effects of triplicated, quadruplicated, etc., exposure to newscasts, recalling that the average format factor for a medium referred to the average fraction of its audience exposed to <u>at least one</u> newscast, and applying each medium's average format factor to each Program occurring on it, we were able to solve for f as follows:

$$\Delta f = 1/3(f - f^2)$$

$$\text{and } f + (N - 1)\,\Delta f \approx P$$

$$\text{so } f = [-(N + 2) \pm \sqrt{(N + 2)^2 - 12(N - 1)P}\,]/2(1 - N)$$

We used this quadratic formula to compute a newscast format factor for each Program on each simulated radio and TV medium.[15] The resulting factors represented average fractions of the Program audiences. We therefore had to convert them to average fractions of the media audiences, i.e., to the parameters required for the simulation, by multiplying them by the Program factors in Table 5.9. A sample of the results is shown in Table 5.10--for a Soviet radio medium and an

---

[15]The positive solution values were taken as the format factors.

Table 5.10--Estimated format factors for two simulated Soviet electronic media.

Medium	Days	Format Factors			
		First Program	Second Program	Fourth Program	Regional Programs
Midmorning radio (8:30-11:59 a.m.)	Mon.-Fri.	0.286	0.158	0.054	0.029
	Sat.	0.314	0.158	0.059	0.029
	Sun.	0.314	0.169	0.059	0.030
Nighttime central television (6:00 p.m.-midnight)	Mon.-Sun. Sun.	0.284	0.102	-	-

all-Union Soviet television medium. The format factors computed in this way for all fourteen simulated Soviet electronic media are listed in Table A.2 of Appendix A, along with a summary of the computation procedure for each medium.

The Soviet Audience of Foreign Radio

Theme-response characteristics

For foreign radio, as for Soviet radio and TV, we had to specify theme-response parameters of the following kind: the relative likelihood of Party versus nonParty members being exposed to newscasts, the relative likelihood of persons with less than four years of education versus persons with between four and seven years of education being exposed, etc.

Each Leisure Study respondent was asked the following questions: "At what time [of day] did you listen [to foreign radio stations] most?" "Could you rank the quality of their news broadcasts? RFE___, BBC___, VOA___, RL___, Other Western stations___, Other Socialist stations___." Respondents who answered the first question but not the second were considered to listen to foreign radio but not to newscasts on foreign radio. Respondents who answered the second question but not the first were considered to be only rare listeners to foreign radio. Only those respondents who answered both questions were regarded as listeners of foreign radio newscasts. It was on the basis of their answers, aggregated over times of day and stations, that we estimated the average and relative theme-exposure probabilities shown in Table 5.11.[16]

Format-response characteristics

For each simulated foreign radio medium we were able to follow a procedure analogous to that described above for radio and TV, to estimate format factors defined as follows: the average proportion of nighttime VOA listeners exposed to a newscast after midnight, the average proportion of daytime BBC listeners exposed to a newscast after 4:00 p.m., etc. Below, we describe how these estimates were made for each of the three major foreign radio stations represented in the simulation.

Because of the comparatively small sample size, we could not use Leisure Study data alone to estimate format factors for each individual foreign radio medium in the simulation. Instead, we aggregated the Leisure Study responses over time slots and different

[16]The same kinds of limitations inherent in the theme-exposure estimates for radio and TV also apply to the corresponding estimates for foreign radio: the sample bias, the likelihood that the news to which respondents listened did not refer simply to international news, the possibility that the real average and relative probabilities of exposure to foreign radio newscasts varied over times of the day, and the fact that relative probabilities of exposure to any newscast are not necessarily the same as relative probabilities of exposure to individual newscasts. However, supporting the plausibility of the resulting estimates are the following features: (1) Among listeners, foreign radio appears to rank second only to domestic radio as a source of news, leading domestic TV and newspapers in this regard; (2) Relative theme-exposure probabilities on each dimension are lower for foreign radio than for domestic TV and newspapers, although not quite as low as for domestic radio; (3) The well educated and males are more likely to listen to news than others. These patterns are consistent with available information on the Soviet foreign radio audience.

Table 5.11--Estimated average and relative probabilities of exposure to foreign radio newscasts on each dimension of the simulated Soviet population

Dimension	Average Theme-Exposure Probability	(N)[a]	Ratio
Sex			
Male	0.844	(51)	1.50
Female	0.562	(16)	
Age			
16-29	0.682	(22)	
30-49	0.750	(32)	0.91
50+	1.000	(13)	0.75
Education			
<4 yrs.	0.540[b]	(-)	
≥4,<7 yrs.	0.636	(11)	0.85
≥7,≤10 yrs.	0.750	(32)	0.85
>10 yrs.	0.875	(24)	0.86
Political Involvement			
Party Member	0.800[c]	(5)	
Non Party Member	0.774	(62)	1.03
Residence			
Urban	0.785	(51)	
Rural	0.750	(16)	1.05

[a]Total number of Comcom respondents on the basis of which the calculations were made.

[b]An extrapolated value, since persons with less than four years of education were not represented in the Leisure Study sample.

[c]We speculate that the unexpectedly small difference in foreign newscast exposure between Party and nonParty members may be spurious--a result of the small N for Party members.

foreign radio stations (as well as different types of newscast formats), and used the results to estimate an average format factor for foreign radio as a whole in each of three education categories: >10 years, >7, ≤10 years, and ≤7 years. The results are summarized in Table 5.12 below.

Table 5.12--Estimated proportion of the Soviet audience of foreign radio exposed to newscasts, by education

Education	Audience Proportions	(N)*
>10 yrs.	0.910	(22)
>7, ≤10 yrs.	0.965	(28)
≤7 yrs.	0.572	(7)

*Total number of Comcom respondents on the basis of which the calculations were made.

We then computed an average newscast format factor for each simulated foreign radio medium by taking a weighted sum of the format factors in Table 5.6, where the weights used were just the medium's estimated audience proportions in the three education categories. Table 5.13 below lists these results for each of the three foreign stations.[17]

[17] Since we used the same set of education marginals for each time slot-station combination, each foreign radio medium in the simulation had one of the average format factors shown in the Table.

Table 5.13--Estimated average newscast format factors for the three foreign radio stations represented in the simulation.

Station	Audience Percentage Breakdown by Education[a] (>10 yrs.)	(>7, ≤10 yrs.)	(≤7 yrs.)	Total	Average Format Factor[b]
VOA	38.0	25.5	36.5	100.0	0.801
BBC	44.0	22.5	33.5	100.0	0.807
RL	36.0	21.0	43.0	100.0	0.775

[a] The education marginals mapped into the computer audiences in Pass I.

[b] The sum of products of a medium's education marginals and the corresponding audience proportions in Table 5.12.

Here we note that, as with radio and TV, the "average format factors" in Table 5.13 represent average proportions of foreign radio audiences exposed to newscasts at all, rather than average proportions exposed to individual newscasts. We also note that among its listeners foreign radio ranks much closer to domestic radio than to TV with regard to use as a news medium.

The next step was to convert the average format factors in Table 5.13 to individual factors for the various newscast formats defined by the possible combinations of foreign radio media, i.e., stations and time slots, with more finely divided time slots and with additional elements limiting the time and/or place of newscast availability. In the case of Voice of America the additional element was the broadcast language--Georgian, Armenian, Ukrainian, or Russian; in the case of the British Broadcasting Corporation, it was the length of the newscast--10, 90, or 110 minutes; and in the case of Radio Liberty, it was target area--Minsk, Moscow, Molotov, Kiev, Kharkhov, Stalingrad, or Tibilis. Thus, before newscast format factors could be estimated

Table 5.14--Estimated distribution of newscasts over simulated VOA, BBC, and RL media, by time slot and by language of media consumption, newscast length, and target area respectively in 1962-63.

Medium	Time Slot	Number of Newscasts			
		Georgian	Armenian	Ukrainian	Russian
Early morning VOA	4:00-7:59 a.m.	0	0	0	2
Daytime VOA	8:00 a.m.-3:59 p.m.	0	0	0	2
	4:00-7:59 p.m.	1	1	1	1
Nighttime VOA	8:00-11:59 p.m.	0	0	0	3
	midnight-3:59 a.m.	0	0	1	2

		10 minute	90 minute	110 minute
Early morning BBC	4:00-7:59 a.m.	0	1	0
Daytime BBC	8:00 a.m.-3:59 p.m.	0	1	1
	4:00-7:59 p.m.	1	1	0
Nighttime BBC	8:00-11:59 p.m.	1	0	1
	midnight-3:59 a.m.	0	0	1

		Minsk	Moscow	Molotov	Kiev	Kharkov	Stalingrad	Tibilis
Early morning RL	4:00-7:59 a.m.	0,2*	4,1	2,3	2,1	4,4	4,1	0,0
Daytime RL	8:00 a.m.-3:59 p.m.	0,2	2,2	0,1	0,2	0,1	1,2	0,0
	4:00-7:59 p.m.	0,3	1,4	0,0	0,3	2,1	1,0	0,0
Nighttime RL	8:00-11:59 p.m.	0,4	4,4	0,2	0,4	0,3	2,3	0,0
	midnight-3:59 a.m.	4,4	4,4	4,1	3,0	4,3	0,4	1,0

*In 1962-63 Radio Liberty was beaming its programs to the USSR simultaneously, each with somewhat different schedules.

for individual foreign radio media, the following additional pieces of information were required: (1) the number of newscasts which occurred in 1962-63 in each medium timeslot-language (newscast length, target area) combination; (2) the distribution of each medium's audience by time slot, and (3) the distribution of each medium's audience by language (newscast length, target area).

From broadcast schedules published by the three major foreign radio stations we were able to obtain the distribution of newscasts by time slot and by broadcast language (VOA), duration (BBC), or target area (RL) (see Appendix B, Tables B.15-B.22). The estimated newscast distributions derived from these schedules are shown in Table 5.14.

We computed an approximate average distribution of foreign radio audiences over three basic times of day and five time slots on the basis of the Radio Liberty listenership data cited in Chapter IV.[18] The results are shown in Table 5.15 below.

Table 5.15--Estimated distribution of the Soviet audience of foreign radio, by time of day and time slot, in 1962-63.*

	Time Slot Factors				
Time of Day	4:00-7:59 a.m.	8:00 a.m.-3:59 p.m.	4:00-7:59 p.m.	8:00-11:59 p.m.	Midnight-3:59 a.m.
Early Morning	1.00	-	-	-	-
Daytime	-	0.10	0.90	-	-
Nighttime	-	-	-	0.64	0.36

*Based on Radio Liberty listenership estimates for the period 1962-64.

[18] See p. , n.

Table 5.16--Estimated distribution of the Soviet audiences of VOA, BBC, and RL, by language of media consumption, newscast length, and target area respectively, in 1962-63.

Audience Proportions*

Language of Media Consumption	VOA		
Georgian	0.016	-	-
Armenian	0.014	-	-
Ukrainian	0.198	0.204	-
Russian	0.772	0.796	1.000
Total	1.000	1.000	1.000

Newscast Length	BBC				
10 minutes	0.333	0.333	-	-	-
90 minutes	-	0.667	1.000	0.500	-
110 minutes	0.667	-	-	0.500	1.000
Total	1.000	1.000	1.000	1.000	1.000

Target Area	RL		
Minsk	0.140	0.148	0.177
Moscow	0.173	0.184	0.218
Molotov	0.150	0.159	-
Kiev	0.177	0.188	0.224
Kharkov	0.213	0.227	0.270
Stalingrad	0.088	0.094	0.111
Tibilis	0.059	-	-
Total	1.000	1.000	1.000

*Audience proportions were estimated for the various combinations of languages, newscast lengths, and target areas encompassed by different time slots.

We estimated the distribution of the VOA audience by language of media consumption on the basis of the distribution of the Soviet population by native language as shown in the 1959 all-Union census.[19] Radio Liberty Committee audience estimates for 1963 provided us with an approximate breakdown of that station's potential listeners by target area, which we used as the approximate audience distribution by target area. Finally, we arbitrarily assumed that the audience sizes for 90 and 110 minute BBC broadcasts during a given time slot were about the same and equalled approximately twice the size of the audience for a 10 minute newscast in that time slot. Table 5.16 shows the distributions of VOA, BBC and Radio Liberty audiences by language of media consumption, length of newscast, and target area respectively, derived from these estimation procedures.[20]

The final step was to compute individual format factors by combining average format factors for the various foreign radio media (Table 5.13) with the estimated distributions of newscasts and media audiences by time slot, and by language, duration, or target area (Tables 5.14, 5.15, and 5.16). This was accomplished by means of the same algebraic procedure which has already been described for radio and TV.[21] A sample of the results--for a VOA medium, a BBC medium,

---

[19]That is, we counted a given person's language of media consumption as that which he gave as his native tongue in the census.

[20]Borter, "Audience Data Estimates."

[21]We used the quadratic formula on p. above to compute a newscast format factor for each time slot and each broadcast language, newscast length or target area. The resulting factors represented

and a Radio Liberty medium--is shown in Table 5.17. The format factors computed in this way for all nine simulated foreign radio media are listed in Table A.3 of Appendix A, together with a summary of the computation procedure for each medium.[22]

---

average fractions of subaudiences--for time slot and language, time slot and newscast length, etc. We therefore had to convert them to average fractions of the media audiences. In the case of VOA this meant multiplying the resulting factors by the time slot and language factors in Tables 5.15 and 5.16, in the case of the BBC, by the time slot and newscast length factors in Tables 5.15 and 5.16, and in the case of RL, by the time slot and target area factors in Tables 5.15 and 5.16.

[22]We arbitrarily assumed that the audience response to the content of oral agitation meetings would be something like the response of Soviet newspaper readers to short news items. We therefore estimated an average newscast format factor for the oral agitation audience as the sum of products of the audience's estimated education-political involvement marginals and the average format factors which had been computed, for short news items, within each education-political involvement category of newspaper readers. Similarly, for relative theme-exposure probabilities on each dimension of the oral agitation audience we used the values which had been estimated for Soviet newspaper readers.

Table 5.17--Estimated format factors for three simulated foreign radio media

Medium	Time Slot	Format Factors						
		Georgian	Armenian	Ukrainian	Russian			
Daytime VOA	8:00 a.m.-3:59 p.m.	-	-	-	0.072			
	4:00-7:59 p.m.	0.012	0.010	0.143	0.560			
		10 minutes	90 minutes	110 minutes				
Daytime BBC	8:00 a.m.-3:59 p.m.	-	0.039	0.039				
	4:00-7:59 p.m.	0.242	0.485	-				
		Minsk	Moscow	Molotov	Kiev	Kharkov	Stalingrad	Tibilis
Daytime RL	8:00 a.m.-3:59 p.m.	0.003	0.003	0.004	0.004	0.006	0.002	-
	4:00-7:59 p.m.	0.099	0.140	-	0.125	0.150	-	-

CHAPTER VI

SIMULATING SOVIET EXPOSURE TO MASS MEDIA MESSAGES DURING THE CUBAN MISSILE CRISIS

CHAPTER VI

SIMULATING SOVIET EXPOSURE TO MASS MEDIA MESSAGES DURING THE CUBAN MISSILE CRISIS

Introduction

Chapters IV and V described how the static portions of the Comcom simulation--pass I and the first part of pass II--were used to map Soviet media-consumption and message-response traits into a sample computer population. In the current chapter and the one which follows it we explore the combined implications and extended consequences of the Comcom simulation as a whole--pass I and pass II--by evaluating its postdictive power in two historical cases.

For this purpose we have confronted our computer sample of the Soviet population with scenarios summarizing the streams of messages that appeared in Soviet mass media and foreign radio transmissions to the USSR during two periods of international tension that arose in the recent past: the Cuban missile crisis and the aftermath of President Kennedy's assassination.

In this chapter the postdictive test and its results will be described for the case of the Cuban missile crisis. Chapter VII covers the same material for the Kennedy assassination.

The Cuban Missile Crisis

Overview

On Monday evening, October 22, 1962, President Kennedy announced in a nationally-televised speech that the United States, to insure its own safety and that of the entire Western Hemisphere, was imposing a quarantine on Cuba to prevent further importation of nuclear missiles and other offensive weapons to that island from the Soviet Union and other communist countries. The President also declared that the United States intended to take whatever military steps were necessary to secure the dismantling and removal of existing Soviet missiles and sites in Cuba. At first, the Soviet Government temporized but by Thursday, October 25th, apparently deterred by America's firm stand, they had begun to retreat, and by Sunday, October 28th, the Soviet Government officially accepted American conditions and announced the withdrawal of their missiles and military personnel from Cuba.

Chronology

The Cuban crisis was a complex East-West confrontation characterized by a large number of interrelated events. Accordingly, it will be useful to present a brief chronology of these events.[1] The crisis was triggered by President Kennedy's quarantine speech, delivered in

---

[1]For a chronology of the Cuban crisis, as well as an outline of significant events preceding the crisis, we have relied on the following sources: Robert D. Crane, "The Cuban Crisis: A Strategic Analysis of American and Soviet Policy," Orbis, VI, No. 4 (1963), 528-46; The Congressional Quarterly Weekly Report, XX, No. 43 (1962), 2049 and 2108-09; F. Gayle Durham, "Scenario--Cuban Crisis" (memorandum prepared for Comcom project, M.I.T., 1966). (Mimeographed.); Department of State Bulletin, XLVII, Nos. 1217 and 1220 (1962).

Washington, D. C. on Monday evening, October 22, 1962, at 7:00 p.m. Eastern Standard Time. We chose to begin the simulation at this point and to have it cover the succeeding ten 24-hour time periods. In the chronology which follows, crisis events are dated in terms of Eastern Standard Time, because most of the historical material available to the author was dated that way. Due to the seven hour time difference between Washington and Moscow, however, the crisis actually began for the Soviets on Tuesday morning, October 23, 1962 at 2 a.m. Moscow Central Time.[1]

---

[1]The Cuban missile crisis probably had its real beginnings as early as July of 1962 when Cuban defense minister Raul Castro visited Moscow at the invitation of Marshal Malinovsky. Castro's talks with top level Soviet military and political leaders resulted, among other things, in the shifting of Cuban cargo reservations from Western to Communist bloc ships. By the end of July a large number of Soviet weapons and technicians had arrived in Cuba, along with a top Soviet rocket-force general. On August 21st the United States reported that fifteen Soviet ships had arrived in Cuba in late July, and the leader of the Cuban refugees, Mira Cardona, claimed 5,000 Soviet troops had also arrived. The next day President Kennedy denied the United States had information Russian troops were in Cuba but he did acknowledge "an increased number of technicians" there. Toward the end of August there were growing reports in the United States press that the Soviets had stepped up shipments of military equipment and technical personnel to Cuba. An article by David Lawrence described in detail the clandestine unloading of Soviet shipments onto trailers the length of ballistic missiles.

The first significant American reaction to these reports came on August 31st, when Senator Keating publicly objected on the Senate floor to the Soviet missile buildup in Cuba. At a press conference on September 4th, President

October 22d.--President Kennedy summoned seventeen Congressional leaders to Washington for a bipartisan briefing. He also called together the Cabinet and National

---

Kennedy acknowledged that Russian missiles had been delivered to Cuba, but he characterized them as "defensive" with a "slant range" of twenty-five miles. Nevertheless, he ordered that the entire island be photographed in detail and, three days later, requested Congress to give him stand-by authority to call up 150,000 military reservists. On September 2d, the Soviets announced their intention to send defensive armaments and technical specialists to Cuba to meet "imperialist threats." On September 8th, the Soviet Ministry of Defense threatened in Krasnaya zvezda to drop nuclear bombs on American bases if the United States started a war over Cuba, and three days later the Soviet government officially warned the United States that an attack on Cuba or Cuban-bound Soviet ships might bring nuclear war. The rest of the month saw growing U.S. concern over the situation in Cuba, and there were even some suggestions of a blockade or the use of armed force in pre-election campaign speeches and Congressional debate. Gromyko reiterated the Soviet warning of possible war over Cuba.

At his September 13th press conference President Kennedy had once again maintained that Soviet missiles in Cuba were "defensive" in nature. Secretary of State Dean Rusk reiterated this view on a news program September 30th. Testifying on October 3d before the House Select Committee on Export Control, Under Secretary George Ball documented these contentions with data on the limited range of the missiles in Cuba. By this time the OAS Foreign Ministers had agreed on a policy of increased surveillance of arms shipments to Cuba, and the United States was denying her ports to ships transporting Soviet bloc supplies to Cuba. On the third weekend in October, five days after Senator Keating had publicly warned that the Soviets were constructing intermediate range ballistic missile launching sites in Cuba, there was a significant reversal in U.S. policy. Reconnaissance flights having confirmed the fact that the force configurations in Cuba was indeed offensive, President Kennedy met with his advisers to plan a response to the Soviet missile buildup. As a result of plans developed at that meeting, both the President and Vice President cancelled all political campaign trips, a general military mobilization and deployment was begun in the

Security Council for meetings. At the same time the Navy was cancelling a scheduled practice landing at Vieques, an island east of Puerto Rico, blaming the dispersal of ships on Hurricane Ella. Press Secretary Pierre Salinger announced that the President would address the Nation on a "subject of the highest national urgency." Then, in an evening speech carried over nationwide radio and television, President Kennedy revealed that the U.S. had stationed naval forces in the Caribbean as part of preparation for a quarantine to prevent further shipment of offensive missiles to Cuba. The President also announced the invocation of an immediate meeting of the OAS to authorize the quarantine so that it could be implemented as soon as possible, and he requested that the United Nations Security Council act on a U.S. resolution which (1) called for the prompt dismantling and withdrawal of all offensive missiles in Cuba under the supervision of a U.N. observer corps and (2) promised termination of the quarantine measures after the observer corps had certified compliance. In his address the President stated that it would be the policy of the U.S. "to regard any nuclear missile launched from Cuba against any nation

---

southeastern part of the United States, and naval maneuvers were initiated in the Caribbean.

in the Western Hemisphere as an attack by the Soviet Union on the United States requiring a full retaliatory response upon the Soviet Union." Simultaneously, the chief U.S. delegate to the U.N., Adlai E. Stevenson, delivered a letter to the President of the Security Council, Valerian A. Zorin, informing him that a quarantine had become necessary to defend the security of the Western Hemisphere "against external interference and aggression."

October 23d.--After hearing from Secretary Rusk that the U.S. had "incontrovertible evidence of missile bases in Cuba," the OAS unanimously adopted a resolution recommending that the member states "take all measures, individually and collectively, including the use of armed force, which they may deem necessary . . . to prevent the missiles in Cuba with offensive capability from ever becoming an active threat to the peace and security of the continent." President Kennedy signed a proclamation, effective on October 24th at 5:00 p.m. Moscow Central Time, ordering "forces under [his] command to stop, search and turn back any ships found carrying offensive weapons to Cuba." American naval and air forces prepared to intercept an estimated twenty-five Soviet bloc vessels headed for Cuba. Support for President Kennedy's actions came not only from Congressional leaders and ex-Presidents Hoover, Truman, and Eisenhower but also from leaders in Great Britain, Italy, and West Germany where, in West Berlin, it was feared the Soviet Union might initiate retaliatory action. The Soviet Union accused the United States of taking a step toward "unleashing thermonuclear war" but did say it was willing to enter negotiations over Cuba. The quarantine was referred to by Cuban Premier Fidel Castro as "the most dangerous adventure since the end of World War II" and a "pirate act." The U.N. Security Council held a special session at which Ambassador Stevenson called for removal of offensive weapons from Cuba, a U.N. observer team to confirm arms removal, and Security Council support of consultations between the United States and Russia on Cuba. Soviet Deputy Foreign Minister Valerian A. Zorin rejected the proposal and charged the United States with "aggression."

October 24th.--The President instructed all Cabinet members not to campaign during the crisis, and the State Department arranged a series of five regional briefings for members of Congress. The Defense Department reported that six ships bound for Cuba had altered course, while others were continuing toward the island. Assistant Defense Secretary Arthur Sylvester said there was now "undeniable evidence" of at least thirty missiles and more than twenty IL-28 jet bombers in Cuba. The President asked Congressional leaders to prepare to be called back to Washington on eight hours notice and he cancelled his November trip to Brazil. France issued a statement in support of the United States. Premier Khrushchev, replying to a telegram from Lord Bertrand Russell, said that the Soviet Union would do nothing reckless but would act if the United States carried out "pirate actions." He also suggested a summit meeting to avoid a thermonuclear war. Acting U.N. Secretary General U Thant appealed to President Kennedy and Premier Khrushchev for a two-week cooling off period to avoid direct military confrontation and possible war. He called for a voluntary suspension of Soviet arms shipments to Cuba and a voluntary lifting of the U.S. quarantine, so that both parties could meet and negotiate.

October 25th.--The State Department announced that at least eight Latin American countries had volunteered to help in the United States quarantine, and the Pentagon reported twelve Russian ships had turned back. The Soviet tanker Bucharest was intercepted by U.S. ships which allowed it to proceed after determining it had only oil aboard. A United States military buildup continued in South Florida although public reaction was reported calm. A total of 1,703 women and children evacuated from the Navy base at Guantanamo Bay arrived at Norfolk, Virginia. In Prague, angry crowds demonstrated in front of the U.S embassy, and in Poland, housewives began a run on foodstores. President Kennedy, in his reply to U Thant's appeal, emphasized that Soviet removal of the offensive weapons in Cuba was a pre-condition of all other action. In the U.N., Ambassador Stevenson engaged in a heated exchange with Soviet Ambassador Zorin about the latter's denial there were Soviet MRBM's and IRBM's in Cuba. Stevenson exhibited aerial reconnaissance photographs of Soviet missile sites in Cuba.

<u>October 26th</u>.--United States officials pointed out that work on missile bases in Cuba was continuing at a "rapid pace." The first search of a Soviet-chartered vessel took place. The <u>Marucla</u>, a ship of Lebanese registry, was boarded and allowed to proceed after no arms were found aboard. President Kennedy received a message from Premier Khrushchev, the text of which was not disclosed. In answering it, the President said Khrushchev's proposals were "generally acceptable." After a new appeal from U Thant to halt action for a "limited time" to permit discussions, the President agreed to avoid a direct confrontation "in the next few days." Premier Khrushchev

said he had ordered Soviet vessels bound for Cuba to avoid the quarantine zone.

<u>October 27th</u>.--The Secretary General of the OAS stated that the United States could forcibly remove offensive missiles from Cuba without further sanction from Latin American allies. A group of Governors offered the President full support in any civil defense effort necessitated by the Cuban crisis. The State Department announced a system of clearances to assist vessels transiting waters in the vicinity of Cuba not carrying offensive weapons. More the 1,000 pickets, including Student Peace Union marchers and the American Nazi party, paraded in front of the White House. Reports from Havana said "unidentified" planes had been fired upon by Cuban anti-aircraft batteries. The United States warned it would take "counter-action" if attempts were made to interfere with its continuing aerial surveillance of Cuba, and a U.S. reconnaissance plane was reported missing after a flight over Cuba. Premier Khrushchev, in a second letter to President Kennedy, offered to withdraw offensive weapons from Cuba if the United States would remove its missiles from Turkey. President Kennedy refused to consider the proposal until work on the Cuban bases was halted and the weapons dismantled.

<u>October 28th</u>.--An American plane flew over Siberia, the President claiming that the overflight was due to a navigational error. Electric power stations of a U.S.-controlled petroleum corporation in Venezuela were dynamited and Communist sabotage was suspected. About 8,000 pacifists rallied near the U.N. building in New York to urge a peaceful settlement of the Cuban problem. Premier Khrushchev sent a third letter to President Kennedy, this time offering to dismantle Soviet missile bases in Cuba under U.N. supervision and to "crate and return" the missiles to Russia in return for a U.S. pledge not to invade Cuba. President Kennedy, in reply to this letter, agreed to lift the quarantine after the missile bases were dismantled under a suitable inspection system, and pledged the United States not to invade Cuba or assist any Latin American country in doing so. The United States continued its military precautions and went on with mobilization of troop carrier reserve units. Cuban Premier Fidel Castro issued terms for Cuba's acceptance of the Kennedy-Khrushchev agreement, which included a demand for the United States' evacuation of Guantanamo Naval Base. Newspapers in England, Ireland, and Italy described the missile showdown as an American success and a Russian surrender. U Thant announced he would leave the following day for Havana but would stay

there only long enough to arrange for U.N. observer teams to inspect the dismantling of missile bases.

October 29th.--President Kennedy agreed to suspend the United States quarantine of Cuba for two days, beginning October 30th, during U Thant's visit to Havana.

October 30th.--Senators Keating, Scott, Capehart and Goldwater warned against any missile removal agreement that would insure a permanent Communist base of operations in Cuba. After learning from Soviet Deputy Foreign Minister Vasily Kuznetsov that the dismantling of Soviet rocket bases in Cuba had already begun, U Thant left for Havana. An initial conference between Thant and Castro made little progress.

October 31st.--U Thant left Cuba but took with him all U.N. personnel, instead of leaving behind an inspection team to observe the dismantling of missile bases. He claimed to have been given assurances the missiles would be removed by November 2d. The United States announced resumption of its naval quarantine and air surveillance, and the Soviet Union announced that Deputy Premier Anastas I. Mikoyan would fly to Cuba on an "urgent mission."[1]

---

[1]On November 2d Republicans asked President Kennedy to clarify eight points, among them whether a Cuban settlement meant Russian jet planes and military personnel would

Themes Coded for the Content Analysis

From our discussion in Chapter III the reader will recall that the first two steps in simulating a computer population's exposure to messages in a given media system are (1) the identification of the classes of content or themes, and types of messages or formats, that are of interest and (2) an analysis of the media's content for the purpose of constructing a scenario in which each message is identified not only by its theme and format but also by the time at which it appeared and the medium in which it appeared. We now proceed to describe the results of these undertakings for the Soviet media system in the case of the Cuban missile crisis.

Coded for the content analysis of Soviet media material and incoming foreign radio transmissions during the Cuban missile crisis were the following themes:

---

remain in Cuba. A day later the President issued a statement that aerial surveillance had shown Soviet missile bases in Cuba were being destroyed. He said that U.S. aerial surveillance would continue in the absence of an international system of inspection. As it happened, the U.S. naval quarantine and aerial surveillance of Cuba were the only forms of inspection and verification ever carried out. Between October 29th and November 9th the Russians removed forty-two offensive missiles from Cuba, and on November 20th the Soviets promised to remove their offensive bombers. The last days of October and early November brought protests from some Congressmen that the President had been too lenient with Khrushchev and should revoke his no-invasion pledge, but thereafter the missile crisis gradually receded in intensity.

1. The U.S. Naval Quarantine of Cuba
2. Reports of Pro-Soviet or Anti-U.S. Reactions
3. Reports of Pro-U.S. or Anti-Soviet Reactions
4. Soviet Allegations of U.S. Hostility Towards Cuba
5. Soviet Agreement to Remove Their Missiles From Cuba
6. U.S. Threats Directed Against the Soviets
7. Soviet Threats Directed Against the U.S.

An individual news item might well have carried more than one of these themes. For example, a single Pravda article on the Cuban debate in the United Nations Security Council might have emphasized Soviet warnings to the U.S. (theme 7) and evidence of long-standing U.S. hostility toward Cuba (theme 4). A Radio Liberty newscast transmitted to the Soviet Union might have reported on the U.S. naval quarantine of Cuba (theme 1) and reactions of world leaders supporting the U.S. move (theme 3). Whenever a single news item made reference to two or more themes this way, the item was recorded for each theme it contained.

We purposely selected themes of a continuing nature rather than discrete themes--such as "the Kennedy speech" or "the Soviet Government's official response." To construct a message scenario which included themes of the latter type would have required a more comprehensive and precise content analysis than was possible with the media material available. As regards the substance of each theme, our choice was influenced by two simulation objectives: (1) To measure the effect of Soviet attempts to suppress, temporarily, some aspects of the Cuban crisis while giving early and heavy emphasis to others; (2) To gauge the degree of success achieved by foreign radio stations in getting the Western version of events through to the Soviet public.[1] First, we hypothesized that

---

[1] Were it not for the constraints of storage capacity and run time, many additional themes could have been included in the simulation. Examples of interesting themes which might be candidates for future simulations are the following:

- --U.S. allegations of Soviet offensive missiles in Cuba (Part of theme 3 in the current simulation)
- --The role of the U.N. in general
- --U Thant's mediating efforts in particular
- --Reports of U.S. force mobiliations (Part of theme 6 in the current simulation)
- --Reports of Soviet force mobilizations (Part of theme 7 in the current simulation)
- --The Soviet offer to exchange removal of their missiles from Cuba for removal of U.S. bases from Turkey
- --The correspondence between Bertrand Russell and Premier Khrushchev

simulated exposure to themes 3, 5, and 7 would indicate the relative effectiveness of selective de-emphasis and understatement practiced by Soviet media during the crisis, and perhaps also, the degree of success achieved by foreign radio broadcasts in countering these tactics. Secondly, we assumed that simulated exposures to themes 2, 4 and 6 would demonstrate the degree of saturation achieved by Soviet media in giving heavy coverage to particular aspects of the crisis. Lastly, we expected the simulated pattern of theme 1 exposures to show the impact of delayed Soviet coverage--i.e., suppression followed by extensive propagation--and the importance of incoming foreign radio transmissions as a supplement and corrective to Soviet domestic reportage during the Cuban crisis.

Appendix B contains a brief description of each theme in the content analysis (as it was explained to the coders) and the code sheets that were used for the various

---

--The correspondence between Bertrand Russell and President Kennedy

--Reports of the U.S. boarding of a Soviet ship

Our choice of themes for the current simulation was guided not only by available media material and the anticipated use of each theme as an index either of propagation or suppression; the seven themes chosen encompass a large and representative proportion of the media messages that appeared during the ten-day period.

media types content analyzed (Tables B.1-B.6).

The Reconstructed Pattern of Theme Appearances

Soviet press coverage

Overview

In cases where news or incidents cannot be suppressed entirely, Soviet authorities use delaying and distorting tactics rather than outright press censorship. This gives the official propaganda apparatus time to prepare itself and the public for material that will eventually have to be released. Soviet press coverage of the Cuban missile crisis provides a clear example of these tactics.[1]

President Kennedy's quarantine speech was delivered in the early morning hours of October 23d, Moscow time.[2] Soviet newspapers published no report of the

---

[1]For a description of how the Soviet press covered the Cuban missile crisis, as well as a summary of Soviet press coverage during the months preceding the crisis (n. 2, pp. and), we have relied on Buzek, *How the Communist Press Works*, pp. 46-48 and 193-40; translated excerpts from *Pravda* and *Izvestia* in *Current Digest of the Soviet Press*, vol. XIV; a conversation with Mr. Leonid Finkelstein, who, at the time of the Cuban crisis, was the editor of a popular Soviet science magazine.

[2]We have already pointed out, however, that the real origins of the Cuban crisis can be located as far

President's statement on the 23d, however, because it was made after their stop-press. On Wednesday, October 24th, Russian newspapers did publish in full a lengthy Soviet official version of Kennedy's speech and the Soviet

---

back as July of 1962. This contention is supported by digests of the Soviet press for the earlier period. Throughout July and August Soviet newspapers carried reports of air and sea violations of Cuba's territorial integrity, committed either by the United States or by Cuban emigrés. Beginning in August, and continuing into September, Soviet mass communications policy was geared to reporting U.S.-sponsored provocations against Cuba, presenting them as evidence of an impending invasion of Cuba by the U.S. Toward the end of August Cuban emigré students shelled Havana from a launch, an incident which drew extensive Soviet press commentary. The blame for emigré "provocations" was repeatedly placed upon the United States. Raul Castro's visit to Moscow and the signing of a Soviet-Cuban technical assistance pact for the Cuban fishing industry were also widely reported in the Soviet press. During September there were repeated Soviet newspaper accounts of "war hysteria" in the United States and reports of an anti-Cuban propaganda campaign allegedly being conducted by Congress and the American press. Soviet newspapers also protested what was described as increasing U.S. economic pressure on Cuba, claiming that a <u>de facto</u> economic blockade of the island existed. Soviet papers charged that the U.S. was trying to involve her NATO and OAS allies in the trade embargo. An official Soviet government warning to the United States issued on September 11th also appeared in Soviet newspapers, as did foreign reactions favoring Soviet policy or denouncing the U.S.'s Cuban policy. In October, before the President's quarantine speech, the Soviet press was increasingly filled with reports of U.S. attempts to pressure OAS members and her European allies into taking a stand against Cuba. Also, there were continued reports of United States violations of Cuban territorial integrity and allegations of stepped up American plans for an invasion of Cuba. Included in these reports were claims that the U.S. was interfering with the transit rights of Cuban-bound ships belonging to other countries as well as stories about actions taken in Congress by the President to bring American armed forces to a state of military preparedness.

Government's reaction to the "aggressive act" and "piracy" of the United States. This story was carried on the front page of most papers, generally under the factual headline "The Statement of the Soviet Government." At the same time, Communist propaganda efforts were being reflected in the writing of Soviet journalists. For example, the editorial article of _Pravda_ on October 24th characterized the American quarantine as the action of "cowardly beasts of prey." It is interesting to note, however, that neither editorial articles of this kind nor the Government statement that was carried by Soviet newspapers on the 24th informed readers of the American allegation that a new and dangerous factor--Soviet missiles in Cuba--had created the need for the quarantine. The most direct reference to American charges about the existence of offensive missiles in Cuba was contained in an article, carried on the second page of most papers under the caption "In the Security Council," that referred to U.N. Ambassador Zorin's denial of "U.S. allegations."

It is a well-known fact that slogans and headlines--the classical form of Communist agitation--become even more numerous in the Soviet press at the time of important international events. _Pravda_'s issues during the Cuban crisis are representative of other Soviet newspapers in this respect. On October 24th the paper carried the following slogans at the top of the front page:

BRIDLE THE HIGH-HANDED AMERICAN AGGRESSORS!

HANDS OFF CUBA!

The leading article was headlined:

FRUSTRATE THE CRIMINAL INTENTIONS OF THE ENEMIES OF PEACE!

At the bottom of the front page Pravda carried a photograph, with an agitational caption, of a demonstration meeting in a Moscow factory.

Over pages 2 and 3 appeared the bold type slogans:

WE ARE WITH YOU, CUBAN BROTHERS!

STOP THIS DANGEROUS GAME WITH FIRE!

Another picture of a factory meeting appeared on the second page, together with the slogan:

THE IMPERIALIST WARMONGERS WILL MEET CRUSHING RESISTANCE

MESSRS IMPERIALISTS, DO NOT THRUST YOUR HEADS INTO FIRE!

Also on page two, above reports of protest meetings organized all over the Soviet Union, were printed slogans such as the following:

THE IRE OF KOLKHOZ PEASANTRY

THE ANGRY VOICE OF MILLIONS, etc.

On Thursday, October 25th, Soviet newspapers still made no mention of U.S. allegations that the Russians had established offensive missile bases in Cuba. With regard to crisis developments, most papers simply printed more detailed accounts of Security Council proceedings than they had the day before. On the 25th, two slogans were spread across the top of the entire front page of <u>Pravda</u>, the first simply repeating the headline of the previous day's leader:

FRUSTRATE THE CRIMINAL INTENTIONS OF THE ENEMIES OF PEACE!

and the second:

DEFEND AND STRENGTHEN PEACE ON EARTH!

This issue of <u>Pravda</u> also carried the following slogans:

IN THE INTEREST OF ALL NATIONS, IN THE NAME OF GENERAL PEACE--REMOVE THE DANGER OF WAR!

ANGRY WORDS FROM THE SOVIET PEOPLE

THE PEOPLES OF THE WORLD ANGRILY DENOUNCE AMERICAN ADVENTURERS

HANDS OFF CUBA

WE WILL DEFEND PEACE ON EARTH

On the front page, above the headline "Angry Words from the Soviet People," Pravda printed a photograph of women attentively listening to the speaker at a factory meeting.

Reproduced quite small on the last page of the October 25th Pravda issue was a picture of demonstrators outside the American embassy in Moscow.

On Friday, October 26th, Soviet newspapers made their first reference to Soviet missile bases in Cuba. However, the missiles were described as defensive in nature and were referred to only in stories about the proposed trade of their removal for the dismantling of U.S. missile bases in Turkey. "Leaders," i.e., headlines in all Central Soviet papers mentioned the proposed

Turkey-Cuba exchange. Slogans which appear, in retrospect, to have been paving the way for the impending reversal of Soviet policy appeared in Pravda:

DO EVERYTHING TO PREVENT WAR
REASON MUST TRIUMPH!

Angry agitational slogans were relegated to the fifth page and severely toned down:

THE FATE OF THE WORLD IS IN THE HANDS OF HUMANITY
THE ROAD TO WAR!
BRIDLE THE AGGRESSORS!

On Saturday, October 27th, most Soviet newspapers adopted a much more strident tone. Heavy attention was devoted to the U.S. naval quarantine, which was characterized as "a flagrant violation of international law" that had moved the world to "the brink of war." The latter emphasis created a mounting panic among large segments of the Soviet population. (Interestingly enough, large slogans and all mention of "American imperialists and aggressors" had entirely disappeared from the front page of Pravda by the 27th; only the foreign news headlines in that paper still maintained a mild agitational tone.)

On Sunday, October 28th, the tone of Soviet newspapers grew nearly hysterical. President Kennedy was portrayed either as a dark and evil personage or as having been misled by the "hawks" around him. Russian papers carried a report that all Soviet officers on vacation had been recalled to their commands, and this news raised tension within the USSR to a new high. According to at least one observer, there was now widespread fear among the Russian population that war might break out at any moment.[1] Also on the 28th, Sunday morning editorials in Pravda, Sovietskaya Rossia, Trud, and Krasnaya zvezda were replaced with the text of two Khrushchev letters: one that had been sent to President Kennedy the day before proposing the simultaneous abolition of missile bases in Cuba and Turkey, and another that had been sent to U Thant on the 26th saying that Soviet vessels had been instructed to keep away from the "piratic" blockade zone around Cuba.

By Monday, October 29th, everything had changed. Virtually the only important Soviet newspapers that published editions on this day were Pravda and Nedelya. Completely gone was the stridency which had been building in the reportage of these and other Soviet newspapers during the previous two days. Also absent was any mention

---

[1] Leonid Finkelstein (see n. , p.).

of the Cuba-Turkey exchange that had been proposed and widely publicized earlier. Both papers carried small articles reporting that, to show Soviet "peaceloving intentions," the Soviet Government had decided to withdraw its missiles from Cuba in return for a U.S. pledge not to invade that island. The publication of this announcement marked the first reference (albeit indirect) in the Soviet press to the offensive capability of Russian missile bases in Cuba. In a sense, it signalled a complete turnabout of the Soviet Government's public posture.

During the next few days Soviet newspapers were filled with self-congratulatory articles praising the Government for its statesmanlike behavior in taking what was repeatedly characterized as a unilateral step towards peace.

We have been describing Soviet press coverage of the Cuban crisis in terms of its shifting emphasis and tonal variations. Much of Soviet newspaper reportage for the period, however, does not lend itself to this kind of analysis. For example, throughout the ten-day period the Soviet press carried reports of foreign reactions favorable to their side of the issue or in opposition to the U.S.'s side. Also included in Soviet newspaper coverage were continuing accounts of (1) U Thant's efforts at intercession and conciliation, (2) meetings at which various Soviet public organizations expressed solidarity with the Cuban people, (3) crisis-related force mobilizations undertaken by the Soviet Union and the United States, and (4) incidents cited as examples of the U.S.'s underlying hostility towards Cuba.

Results of the content analysis

We have analyzed the content of seven all-Union and six Republic-level Soviet newspapers as well as two Soviet magazines during the ten-day Cuban crisis period covered by the simulation. Approximately 10,000 different stories were coded--not only for each of the seven themes listed above and described in Appendix B, but for ten different article formats as well.[1] The coding of themes was limited to fifteen of the thirty-two Soviet print media in the simulation, for the following reasons: (1) Copies of only nine of the thirteen all-Union print media in the simulation were available for October of 1962; (2) On the Republic level, only copies of Party-Government editions were available for the October 1962

---

[1]The print titles used in the content analysis are listed in Appendix B (Table B.9) and the article formats coded for this content analysis are identified on the sample press code sheet in Appendix B (Table B.1).

period, and it was felt that a representative picture could be obtained by content analyzing six of these; (3) No copies of subRepublic print titles were available for October of 1962. Accordingly, from the thematic treatment of the Cuban crisis in fifteen Soviet publications content analyzed, we had to infer a likely pattern of theme appearances over the other seventeen Soviet print media in the simulation. The publication periodicities and assumptions used in making these inferences are outlined in Appendix B.

Table 6.1 summarizes the message schedule obtained by content analyzing all-Union and Republic-level Soviet newspapers and spreading the resulting theme appearances over all thirty-two Soviet print media conceptualized in the simulation.[1] It shows an estimated total of 4,416 occurrences of the seven themes in the thirty-two print media. As we had hypothesized, two of the most prominent themes were the ones entitled "Reports of Pro-Soviet or Anti-U.S. Reactions" (theme 2) and "Allegations of U.S. Hostility towards Cuba" (theme 4). It is not surprising to find over half the total messages related to these themes. They represent the Russian side of the story and, therefore, a version which we might expect to have received

---

[1]For the print titles or types which each of these thirty-two media encompass see Appendix B (Table B.9).

TABLE 6.1.-- Content analysis for seven themes about the Cuban missile crisis occurring in the Soviet press, October 23d - November 1st, 1962

Themes Coded	Day 23	24	25	26	27	28	29	30	31	1	Total No. of Press Occurrences of the Theme
1. The U.S. naval quarantine of Cuba	0 / 0 / 0	92[a] / 64[b] / 156[c]	135 / 129 / 264	109 / 143 / 252	82 / 117 / 199	86 / 96 / 182	3 / 5 / 8	55 / 94 / 149	24 / 45 / 69	15 / 20 / 35	601 / 713 / 1,314
2. Reports of pro-Soviet or anti-U.S reactions	4 / 3 / 7	93 / 70 / 163	149 / 100 / 249	194 / 103 / 277	108 / 83 / 191	76 / 60 / 136	9 / 8 / 17	86 / 74 / 160	90 / 84 / 174	73 / 43 / 116	862 / 628 / 1,490
3. Reports of pro-U.S. or anti-Soviet reactions	0 / 0 / 0	26 / 21 / 47	28 / 27 / 55	21 / 25 / 46	32 / 27 / 59	28 / 18 / 46	3 / 5 / 8	27 / 18 / 45	6 / 11 / 17	5 / 0 / 5	176 / 152 / 328
4. Soviet allegations of U.S. Hostility towards Cuba	16 / 18 / 34	106 / 49 / 155	116 / 76 / 192	100 / 72 / 172	70 / 58 / 128	82 / 46 / 128	2 / 3 / 5	46 / 51 / 97	17 / 41 / 58	14 / 7 / 21	569 / 421 / 990
5. Soviet agreement to remove their missiles from Cuba	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	4 / 2 / 6	36 / 26 / 62	8 / 24 / 32	6 / 3 / 9	54 / 55 / 109
6. U.S. threats directed against the Soviets	0 / 0 / 0	15 / 14 / 29	4 / 8 / 12	2 / 2 / 4	5 / 3 / 8	2 / 0 / 2	0 / 0 / 0	1 / 0 / 1	1 / 0 / 1	0 / 0 / 0	30 / 27 / 57
7. Soviet threats directed against the U.S.	0 / 0 / 0	28 / 17 / 45	16 / 8 / 24	11 / 5 / 16	3 / 5 / 8	13 / 13 / 26	0 / 0 / 0	0 / 9 / 9	0 / 0 / 0	0 / 0 / 0	71 / 57 / 128
Total No. of Theme Occurrences in the Soviet Press during the Day	20 / 21 / 41	360 / 235 / 595	448 / 348 / 796	417 / 350 / 767	300 / 293 / 593	287 / 233 / 520	21 / 23 / 44	251 / 272 / 523	146 / 205 / 351	113 / 73 / 186	2,363 / 2,053 / 4,416

[a] No. of press occurrences found in the content analysis.
[b] Additional no. of press occurrences inferred.
[c] Total no. of press occurrences.

greatly disproportionate emphasis in the Soviet press. Another prominent theme was "the U.S. Naval Quarantine of Cuba" (theme 1). The early appearance of this theme in Soviet press coverage of the Cuban crisis probably reflects the Soviet authorities' undoubted awareness that large segments of their population were learning about the quarantine via short-wave radio transmissions from the West. Considering the boldness of this American maneuver, which came very close to being an act of war, the heavy coverage it received in the Soviet press is readily understood.

Each of the remaining four themes used in the content analysis was covered relatively lightly by the fifteen Soviet publications. Reflecting the characteristic one-sidedness of Soviet crisis coverage are the comparatively few mentions of "Reports of Pro-U.S. or Anti-Soviet Reactions" (theme 3). Virtually all mentions of this theme (which occurred only about one-fifth as often as "Reports of Pro-Soviet or Anti-U.S. Reactions" [theme 2]) appeared in the context of either a refutation of the report's substance or a discreditation of its source. "Soviet Agreement to Remove their Missiles from Cuba" (theme 5) also did not receive heavy coverage. One might expect this to have been the case, however, because the agreement marked a dramatic and somewhat contradictory retreat by the Soviet Government from its initial stand in the confrontation.

It is interesting to note that, contrary to our expectation, the high level of threat perception which apparently existed within the Soviet population (and probably also within the Government) during this period is not reflected in a relatively large number of press occurrences of the theme "U.S. Threats Directed Against the Soviets" (theme 6). At least two explanations suggest themselves: First, the coder may have failed to record, for this theme, messages which implicitly carried the idea of a United States threat to Soviet security. For example, discussions of the U.S. naval quarantine or reports of its enforcement, referring as they frequently did to the possible boarding of Russian ships, may well have carried with them the implicit suggestion of a threat to Soviet security. (The coder did not make this assumption, however.) The Central Committee officials who guide press coverage may have wished to avoid such ultimately disturbing messages that would have changed the perception of the crisis from one in Cuba to one reaching the homeland.

Finally, we note, as expected, the comparatively small number of press occurrences of the theme "Soviet Threats Directed Against the U.S." (theme 7) and the virtual disappearance of this theme after the Soviets had agreed to remove their missiles from Cuba. The relatively infrequent press accounts of "Soviet threats directed against the U.S." reflects the facts that (1) stories referring to Soviet missiles in Cuba (which were coded for this theme) did not appear in Russian newspapers until the fourth day of the crisis, and (2) except for an oblique reference in the announcement of their withdrawal, stories about the offensive nature of these missiles (which would have been coded for this theme) were never published.

The results of the content analysis demonstrate not only the effects of selective propagation (themes 1, 2 and 4) and de-emphasis (themes 3, 5 and 7) in Soviet press coverage of the Cuban crisis, but also the manner in which Soviet communications strategy was geared to the ebb and flow of the crisis. This can be seen not only in the gradual buildup and subsequent steady decline of total theme occurrences over time, but also in the distribution of each individual theme's occurrences over the days of the crisis period. The appearance of theme 5 in the Soviet press on the 29th signalled the denoúment of the crisis. The Soviets had agreed to dismantle their Cuban missile bases. From this day on--with the exception of "Reports of Pro-Soviet or Anti-U.S. Reactions" (theme 2), for which stories about world admiration of the Soviet move were recorded)--the daily number of occurrences of each theme gradually declined. As the intensity of the crisis was diminishing, related aspects of the Soviet newspaper campaign were gradually being phased out.[1]

Soviet radio and television coverage

Overview

The Russian authorities' use of delaying and distorting tactics in reporting news of the Cuban missile crisis to the home population was apparent not only in Soviet press coverage of the crisis but in Soviet radio

---

[1] In the content analysis of the Soviet press, the same person, working closely with the author, coded all stories in every issue of the fifteen publications. The coder participated in the development and definition of the format categories that were used. In any event, the content analysis appears to be sufficiently accurate as input for the simulation when one considers the assumpations we had to make in order to infer the overall pattern of newspaper message appearances.

reportage as well.[1]

News of President Kennedy's speech, delivered at 2:00 a.m. Moscow Central Time on October 23d, did not appear in Soviet domestic media until some nine hours later.[2] Soviet radio, the first domestic source, carried

---

[1] For a description of Soviet radio reportage on the Cuban missile crisis, as well as a review of Soviet radio coverage during the months preceding the crisis (n. 2, pp.   ), we have relied on the F.B.I.S. Daily Report, Nos. 207-14; Buzek, How the Communist Press Works, pp. 46-48 and 139-40; the conversation with Finkelstein.

[2] Nevertheless, monitoring reports on Soviet domestic radio transmissions during the three months preceding Kennedy's dramatic announcement, together with the digests of the Soviet press summarized above (n. 2, pp.   and   ), provide solid evidence that major ingredients of the crisis were present during this earlier period. The August shelling of Havana by Cuban emigrés drew extensive commentary on the Soviet domestic service, as had Raul Castro's July visit to Moscow and the subsequent signing of a Soviet-Cuban technical assistance pact. During September the Moscow home service continually carried accounts of alleged United States-backed provocations of Cuba and warned that the U.S. was planning an immanent invasion of Cuba. In September Soviet domestic radio broadcasts also described foreign reactions and demonstrations supporting Soviet policy towards Cuba or denouncing U.S. actions in the Caribbean. Accounts of anti-Cuban war hysteria in the United States and extensive commentary on U.S economic sanctions against Cuba were widely broadcast by Moscow radio in September. The Moscow domestic service also carried an account of the September 2d communiqué announcing Soviet technical and arms assistance for Cuba and broadcast the official Soviet Government warning to the U.S., issued on September 11th. Many references to allegedly nefarious objectives of the OAS conference scheduled for October 2d also appeared in Soviet domestic radio broadcasts during September, as well as numerous accusations that the United States was attempting to use the current U.N. session for selfish purposes. The first half of October saw a sharp increase in Soviet

a brief and distorted TASS announcement which made no reference at all to the U.S. naval quarantine or the Soviet

---

domestic radio accounts of alleged "provocative" U.S. activities in relation to Cuba. Frequently mentioned in this regard were the OAS conference, the call-up of U.S. reserves, and Congressional anti-Cuban speeches.

In the forty-eight hour period before President Kennedy's speech, fears of an immanent U.S. invasion of Cuba appear to have reached a peak in the Soviet Union. The Moscow domestic service cited reports that an emergency meeting of OAS members had been called in connection with "new aggressive actions" against Cuba, adding that a battalion of U.S. marines had been dispatched to the Guantanamo naval base. Moscow radio gave heavy attention to the "continuous conferences of supreme military leaders" in Washington, President Kennedy's sudden return to Washington for talks with top officials, and U.S. military maneuvers in the Caribbean. Moscow domestic service commentator Druzhinin said the atmosphere in the United States was "becoming hotter literally with every hour." Moscow commentator Shakhov declared that Washington had realized that the American propaganda campaign against Cuba was not frightening anyone, so it had decided to resort to military demonstrations and was carrying out large-scale maneuvers in the Caribbean, including landing operations, while provocations from the American base at Guantanamo had become more frequent. Shakhov went on to say that this campaign was only aimed at lulling the world public and serving as a smokescreen for *preparations to attack Cuba* (italics are mine). Another Radio Moscow commentator said that American papers had been ordered to shout as much as possible about U.S. military might and the nature of the Caribbean maneuvers in order to intimidate the Cuban people, to demonstrate U.S. determination, and to exacerbate the international situation. Finally, an International Review published in *Pravda* and reported by TASS said there was "alarming news" that Washington was "hatching a new adventure" and declared that the aggressors [intended] to bring international tension to red heat," warning that "he who plays with fire risks burning his fingers."

During the three-month period *before* President Kennedy's quarantine speech, the general argument for the Soviet position broadcast by the Moscow home service emphasized the following key points: (1) Soviet arms shipments to Cuba were for defensive purposes and therefore constituted no threat to the United States' security;

missiles in Cuba. During the afternoon and evening of the 23d, Soviet radio carried TASS reports that Marshal Grechko, Commander in Chief of the Warsaw Pact forces, had ordered the implementation of "several measures in increasing the military preparedness of troops and navies which (were) members of the united armed forces," and that the Soviet Defense Ministry had been ordered to "hold up the release of senior-age groups in the strategic rocket troops, troops of antiaircraft defense, and personnel of the submarine fleet until further notice, to cancel the leave of all personnel, and to raise the battle readiness and vigilance of all troops." However, none of these relatively brief reports made any mention of the U.S. naval quarantine of Cuba or Soviet missile bases on the

---

(2) The Soviet Union had no need to station rockets beyond her own borders; (3) The United States' real fear about the Cuban revolution was that it might ignite similar Latin American movements; (4) The United States' policy towards Cuba was part of a world-wide strategy of tension manipulation; (5) Current U.S. intervention in Russian affairs after the October 17th revolution; (6) United States overseas bases and naval fleets, not Soviet defensive arms in Cuba, were the real threat to world peace.

island.

It was left to a 2,500-word Soviet Government statement, issued in the late-evening hours of October 23d and carried by the Moscow home service at 11:30 p.m. Moscow Central Time, more than twenty-one hours after President Kennedy's broadcast, to explain in full the nature of the U.S. naval quarantine. But not even this statement mentioned the Soviet missiles and bases in Cuba. Characterizing the quarantine as "an aggressive act [of] piracy," the Soviet Government statement warned the U.S. that "by taking the measures announced by President Kennedy it [was assuming] a grave responsibility for the destinies of peace, and [was] recklessly playing with fire." The Government statement went on to declare that "if the aggressors touched off a war, the Soviet Union would strike a very powerful retaliatory blow" and that by insisting "military equipment Cuba needs for self-defense be removed from Cuban territory," the United States was making a demand "which naturally no state which values its independence [could] meet." The statement concluded with the veiled threat that the Soviet Government was taking "all necessary measures for preventing [the] country from being taken unawares and to enable it to offer a deserved reply to the aggressor."

Other activities triggered by the U.S. naval quarantine of Cuba, and reported by Moscow radio either late in the evening of the 23d or early on the morning of the 24th, included a meeting called by First Deputy Premier Kuznetzov at which ambassadors of the socialist countries were informed of the Soviet Government statement, and a meeting of Kuznetzov with American Ambassador Kohler who was handed the 2,500-word Soviet Government "reply to the statement by U.S. President John Kennedy." At this time, Moscow radio also carried TASS reportage of remarks to the U.N. Security Council by Soviet Ambassador Zorin in which he asserted that the question of Cuba being a threat to the United States was "mythical" and a "clumsy attempt to cover up unprecedented aggressive actions undertaken by the United States against Cuba."

On October 24th Soviet radio broadcast a much greater amount of material about the Cuban crisis than it had the day before. Radio Moscow carried a TASS report that the Soviet Foreign Ministry had returned the note received from the U.S. Embassy "accompanying the list of measures arbitrarily taken by the U.S. Government to establish a sea blockade of Cuba." Another significant piece of Soviet radio reportage on the 24th was a Pravda editorial, reviewed by TASS, charging that U.S. actions concerning Cuba were a crude violation of elementary standards of international law and all international customs, and were incompatible with the principles of the U.N. Charter. TASS reported the paper as having said that, in taking this "latest gamble," U.S. ruling circles were "acting like cowardly beasts" and were "lying and dodging" because they knew that "peace-loving peoples [would] brand them with ignominy." The TASS report went on to say that Pravda had termed U.S. military actions "gross blackmail which might lead to disastrous consequences for all mankind," and had asserted that "a special responsibility [rested] with the United Nations . . ." to discharge its mission or it "[would] share the destiny of the League of Nations and the universal contempt of the peoples."

On October 24th Radio Moscow also carried a round-table discussion by Izvestia and Radio Moscow commentators who charged that the U.S. Defense Department had produced "some kind of faked photographs taken from spy planes" to justify its "aggressive" acts. The commentators said that it was "difficult to interpret other than as an act of direct aggression" the naval "blockade" against Cuba, and warned that the socialist countries "possessed impressive means for cooling down the ardor of bellicose and zealous generals and admirals and all those who [were singing] their tune" in the United States. Radio Moscow also reported a statement by TASS commentator Orlov that the "lying diversionist fable" about the supplying of Soviet "offensive weapons" to Cuba had deceived no one, and Moscow's domestic commentator Shragin declared that the "big lie" which in the United States had been brought to the level of presidential statements had but one aim: to cover or to justify "in any way" the "far-reaching aggressive actions of the United States." Finally on the 24th, the Moscow domestic service carried a TASS report of proceedings in the U.N. Security Council which said that the "fabrications" of the U.S. delegation had also been adopted by British delegate Dean.

In none of the heavy Soviet radio reportage on October 24th was there any direct mention of American charges about the existence of offensive Soviet missiles in Cuba. The allusion in the roundtable discussion mentioned above to "faked photographs" was the closest and only reference to these allegations.

On October 25th the Moscow home service carried a TASS review of an Izvestia article which asserted that "small Cuba [had] powerful friends" who had everything necessary to make the imperialists "lose their taste for poking their noses into the internal affairs" of others. October 25th also saw the first mention in

Soviet domestic media of U.S. allegations about offensive Russian missiles in Cuba. Radio Msocow charged that the United States had "dug up a pile of hysterical rubbish and brought to light falsehoods about Soviet offensive rockets in Cuba." It went on to say that the USSR had "sufficiently powerful rocket carriers for its nuclear warheads and there [was] no need to seek sites for them outside of the borders of [the] country." Radio Moscow also stated that if the United States began "intercepting and searching vessels bound for Cuba, it [would] be tantamount to aggression," and declared that "retaliatory measures [could not] but follow."

On October 25th the Moscow home service also carried a TASS report of a Krasnaya zvezda article which reviewed a speech given to an army conference by Soviet Defense Minister Malinovsky in which he declared that the "high preparedness and invincible might" of the Soviet armed forces was considered to be the "antidote to the strategy of imperialism which [was boiling] down to preparations for preventive war." According to the TASS report, Malinovsky had also declared that "at the first signal, the entire might of [Soviet] armed forces [had to] be immediately brought to bear against the enemy, his military-strategic, economic, and political centers, and his main groupings of troops." The minister was also reported to have said that Soviet "global rockets" had "deleted from military strategy the notion of geographic invulnerability," and to have pointed out that the Soviet Union possessed nuclear weapons of small and large caliber ranging up to 50-60 megatons and more.

Finally on the 25th, Khrushchev's reply to a telegram from Bertrand Russell (appealing to him not to be provoked by the "unjustified action" of the United States against Cuba) was transmitted textually by TASS and widely broadcast by Moscow radio. In his letter to Russell, Khrushchev stated that the Soviet Government would not take "any reckless decisions" and went on to say that the question of war and peace was so vital that "we should consider useful a top-level meeting to discuss all the questions that have arisen, to do everything to remove the danger of unleashing a thermonuclear war."

On October 26th the Cuban crisis was the dominant topic in Soviet domestic radio transmissions, with broadcasts highlighting reports of protest statements and meetings at home and abroad. The Moscow domestic service carried reports on protest meetings that had taken place in Berlin, New York, London, and other major cities. It reported that the Chinese Peoples' Republic had issued a statement supporting Cuba and that the Soviet U.N.

Association had lodged a protest against the U.S. quarantine. Also broadcast by the Moscow home service on the 26th were several roundups of world reaction critical of U.S. policy, along with a TASS report that heads of churches and religious organizations in the USSR had condemned the U.S. actions. A _Pravda_ editorial, summarized by TASS and carried textually on the Moscow domestic service, said a wave of mass meetings had swept over the Soviet Union "unanimously supporting the Soviet statement, wrathfully condemning the criminal actions of the U.S. aggressors," and conveying messages of solidarity to the Cuban people. The editorial went on to say that the USSR "resolutely condemned the piratical actions of the U.S. ruling circles" and was ready to do everything to prevent a military disaster.

Also broadcast by the Moscow domestic service on October 26th was a TASS-reviewed _Krasnaya zvezda_ editorial which called for "vigilance and military preparedness." The editorial declared that "unprecedented aggressive actions" of the United States had caused the USSR to take steps to increase the military preparedness of Soviet armed forces, and this applied "above all to the strategic rocket forces, which [were] the main striking force of the Soviet Army." Another _Pravda_ article reviewed by TASS and carried textually on the Moscow home service said that after many months during which the

United States had tried to pose as a peacemaker, "the sham [had] come to an end." The article went on to say that nothing had so exposed "the real predatory nature" of U.S. ruling circles as the "provocative hysteria they [were] whipping up around Cuba," concluding that Washington had been driven in its provocative acts by an "animal fear of the onward march of history."

Widely broadcast by Radio Moscow on October 26th were an "urgent appeal" from U.N. Acting Secretary General U Thant, proposing that arms shipments to Cuba and the blockade be suspended for two or three weeks to allow time for peaceful negotiations, and Khrushchev's reply to this appeal, which he described as in accord "with the interests of peace." Radio Moscow also carried a Pravda editorial which said that "too much was at stake as a result of the piratic actions of the American military on the high seas" and stated that the USSR was ready "to do everything to prevent the unleashing of war." The Pravda editorial also said that the world welcomed Soviet Premier Khrushchev's reply to Bertrand Russell and his acceptance of U Thant's appeal as proof of the "good will and love for peace of the great Soviet power," and was expecting that at "this crucial hour the U.S. Government [would] heed the voice of reason and weigh all consequences of its reckless policy."

Washington had to realize that the situation, if "aggravated to the extreme, [could] push the world into an abyss of war," the editorial stated. Radio Moscow asserted that it was necessary for the United States, as well as the Soviet Union, to "display the greatest wisdom and commonsense in evaluating the current international situation."

On the 26th the Moscow home service also carried a TASS report of the previous day's U.N. Security Council debate. The report said that the "groundless position" of Mr. Stevenson, who "again repeated the absurd claim "that it had been necessary to establish the quarantine, had been subjected to "devastating criticism by Soviet delegate Zorin in a vivid speech replete with facts." The TASS report went on to say that after Zorin had "strongly denounced and exposed Stevenson's false interpretation of Khrushchev's reply to Lord Russell," the U.S. Ambassador "tried to assume the role of an accuser and to put questions to the Soviet representative which [could] only be described as demogogic."

Other Moscow radio comment on the 26th was largely concerned with denying President Kennedy's assertion that the USSR had supplied offensive weapons to Cuba. Stating that President Kennedy's position "could be understood only if there really [were] a threat" to the United States from Cuba, Moscow radio said the President's charge that there were "offensive Soviet rockets" in Cuba was a "great lie" because nobody could say "that he [had] seen these Soviet weapons of attack in Cuba." A widely broadcast Vavilov commentary said that the photographs purporting to prove the existence of missile sites in Cuba could not be considered proof, citing the opinion of British military experts as reported by the Daily Mail. Moscow radio commentator Leonov, in a widely broadcast talk, said President Kennedy's assertion that the USSR had delivered offensive missiles to Cuba was a "barefaced lie," invented to stun the American people and the allies of the United States and thereby justify Washington's aggressive policy. Another commentary carried on the home service, by one Aleksayev, said mankind was "approaching the final border of nuclear war." "This [would] be the result," he asserted, if the United States maintained its blockade and carried out its threat to sink ships "which [did] not obey the orders of the American pirates." At the same time several Moscow broadcasts reported that ships loaded with "peaceful cargoes" were leaving Soviet ports for Cuba.

On October 27th Radio comment from Moscow--prior to the release of Khrushchev's letter to President Kennedy proposing the Cuba-Turkey exchange--including a TASS-reviewed Sovietskaya Rossia article by Borisov which "[unmasked] the fakes fabricated by the Pentagon and claimed by the U.S Defense Department to be 'documents' allegedly proving the presence of 'offensive' weapons in Cuba." The author said one might laugh at the photographs shown at a Pentagon press conference were it not that these "fakes had been the cause of the most unbridled war hysteria." A Korinov article in Pravda, reviewed over the Moscow home service, said that the U.S. actions were not caused by "mythical offensive weapons allegedly in Cuba" or election campaign maneuvering by the ruling Democrats, but by economic recessions, unemployment, and the threatened loss of leadership by the West.

The substance of Khrushchev's letter to President Kennedy proposing the simultaneous abolition of missile bases in Cuba and Turkey was broadcast for the first time by the Moscow domestic service at 5:00 p.m. Moscow Central Time on the 27th. For the remainder of the day this letter was the leading topic in Soviet domestic radio broadcasts. Khrushchev's message to U Thant saying that Soviet vessels had been instructed to keep away from the "piratic" blockade zone around Cuba was also widely distributed by the Moscow domestic service.

The text of Khrushchev's October 28th message to President Kennedy, stating that orders had been given to Soviet officers to dismantle missile bases in Cuba and ship them back to the USSR under U.N. supervision, was first broadcast by the Moscow home service at 5:00 p.m. Moscow Central Time on the 28th. Khrushchev's message to U Thant and President Kennedy's statement welcoming the Soviet Premier's "statesmanlike decision" were also texted by TASS and the Moscow domestic service. Moscow radio's main evening news bulletin on the 28th, largely devoted to a roundup of foreign reaction, said that all leading news agencies in other countries had interrupted their regular transmissions to give summaries of Khrushchev's message as the world listened with rapt attention.

On October 29th, and for several days thereafter, material relating to the Cuban situation continued to receive priority treatment in Soviet domestic radio broadcasts, although its volume was markedly reduced from the level that had been maintained during the previous week. Radio comment on the 29th and 30th generally hailed the Soviet decision, stressing that it constituted a "victory for reason and commonsense" and had aroused hope in all parts of the world. A widely broadcast article by Moscow commentator Viktorov emphasized that Khrushchev's decision to dismantle missile sites in Cuba had come as a result of Kennedy's declaration that there would be no attack on the country by the United States or other countries in the Western Hemisphere. A Druzhinin report from New York for the Moscow domestic service said that people in America were sighing with relief over the developments after having existed in an atmosphere of "military hysteria." Many Americans, he added, understood well that it was only the restraint of the Soviet Union, which had refused to let itself be provoked into military conflict, that had halted those who were contemplating military adventure against Cuba. TASS also transmitted a New York report by Pravda commentators Zhukov and Mayevskiy warning that reactionary propaganda was continuing "its sinister deeds." Fresh aggressive plans against Cuba were being hatched behind "tightly closed doors of certain 'offices,'" the authors said, stressing that there was still the danger of new "complications" which could only be avoided if U.S. statesmen demonstrated the same wisdom as the Soviet Union had displayed, proceeding from "positions of reason" and not from "positions of strength." Also on the 30th, TASS reported without comment the news that the United States would lift its quarantine of Cuba during U Thant's two-day visit there.

On October 31st the Moscow home service carried a Tass-reviewed Pravda article which charged that "several irresponsible persons" in the United States continued to call for an invasion of Cuba and were seeking to prevent a relaxation of tension in the area. Under these circumstances, the article said, "the strict fulfillment of the pledges assumed by the United States" to respect the integrity of Cuba was "acquiring special importance." Radio Moscow said that if such recent statements by persons in "quite influential circles" in the United States formed the "basis of U.S. policy, it would sow the seeds of further conflicts fraught with the most dangerous consequences for peace in general." Also on October 31st, the Moscow domestic service reviewed an Izvestia editorial that had appeared under the heading "Reason Prevails," which declared that the course of events in the Cuban situation had demonstrated that the "farsighted and wise course" of the Soviet Government had been the "only correct one" in the situation which had developed. It had led to the creation of conditions in which the interests of general peace and the independence and integrity of the Cuban republic would be insured, the editorial added, cautioning, however, that "dark clouds still [hung] over the Caribbean basin" and the "greatest vigilance" would be necessary to foil any and all intrigues of the forces of aggression.

A Shragin commentary broadcast to the Soviet people on the 31st remarked that some individuals belonging to "quite influential circles" in the United States were not pleased with the course of events. Shragin noted that Senator Capehart was not concealing "his rage" over the fact that the United States had pledged not to attack

Cuba, adding that Capehart was being echoed by Senator Goldwater, who called for a harsher policy toward Cuba. Such provocative statements by no means facilitated the implementation of the agreement that had been achieved, Shragin concluded. The Moscow domestic service also carried a TASS-reviewed Pravda article by Borovskiy, on the 31st, which told of "malicious anti-Cuban concoctions" spread by "several irresponsible persons" in the United States who were continuing to instigate an invasion of the island and were seeking to prevent a relaxation of the tension they had created. The author went on to say that the Soviet people believed the U.S Government would refrain from "shortsighted steps" and would be able to curb "irresponsible instigators." Another Moscow domestic commentator asserted that while U Thant was in Havana for talks, counterrevolutionary leader Miro Cardona had issued a provocative statement saying that he reserved "the right to use force against Castro."

Lastly, an Izvestia report transmitted by TASS on October 31st delcared that the temporary lifting of the blockade while U Thant was in Cuba had emphasized the necessity of ending it once and for all.

Results of the content analysis

We have content analyzed a sample of the material transmitted over the Moscow domestic service during the ten-day Cuban crisis period covered by the simulation. Approximately fifty different broadcasts were coded--not only for each of the seven themes referred to above, but for six different times of day as well.[1] The coding of themes was limited to broadcasts carried by the Moscow domestic service and to only a small sample of the total material broadcast by this source during the Cuban crisis, because no record of other Soviet radio commentary was available for the period. But the ten Soviet radio media in the simulation were conceptualized in such a way that only four of them consisted strictly of the all-Union Moscow home service broadcasts. Another four were made up entirely of local broadcasts and the remaining two combined local with all-Union broadcasts. This meant that, from the thematic treatment of the Cuban Crisis in the fifty or so Moscow domestic service broadcasts content analyzed, we had to infer a pattern of theme appearances over all the broadcasts likely to have been carried during

---

[1]The times of day coded for the content analysis of Soviet radio broadcasts, and for the content inference of Soviet television broadcasts, appear on sample code sheets (Tables B.2 and B.3) in Appendix B.

this period by the ten Soviet radio media in the simulation. Moreover, there was no available record of Soviet television broadcasts during the Cuban crisis period, so we also had to use the results of the radio content analysis to infer a pattern of theme appearances over all the broadcasts likely to have been carried during this period by the four television media in the simulation. The radio and television broadcast schedules as well as the assumptions used in making these inferences are included in Appendix B (Tables B.10, B.12, B.13, and B.14).

Tables 6.2 and 6.3 summarize the message schedules obtained by content analyzing Moscow domestic service broadcasts and spreading the resulting theme appearances over all fourteen Soviet electronic media in the simulation. They show estimated totals of 1,706 occurrences of the seven themes in the ten radio media and 1,618 occurrences of the seven themes in the four television media.[1] Several features of the resulting radio and television message schedules are worth noting. First, they bear a close resemblance to the message schedule obtained (from considerably better data) for the Soviet press (Table 6.1) in regard to the total number of occurrences of each theme

---

[1] For the portions of the day which each of these fourteen media span see Appendix B (Tables B.12 and B.14).

TABLE 6.2.-- Content analysis for seven themes about the Cuban missile crisis occurring on Soviet radio, October 23d - November 1st, 1962

Themes Coded	Day: 23	24	25	26	27	28	29	30	31	1	Total No. of Radio Occurrences of the Theme
1. The U.S. naval quarantine of Cuba	2[a] 56[b] 58[c]	1 33 34	0 9[d] 9	3 77 80	5 80 85	1 19 20	0 0 0	1 23 24	1 42 43	1 20 21	15 359 374
2. Reports of pro-Soviet or anti-U.S. reactions	2 32 34	1 16 17	1 34 35	1 53 54	2 43 45	1 34 35	7 93 100	2 49 51	2 47 49	0 0 0	19 401 420
3. Reports of pro-U.S. or anti-Soviet reactions	1 23 24	0 0 0	1 23 24	1 23 24	0 0 0	0 0 0	0 0 0	0 0 0	1 33 34	0 0 0	4 102 106
4. Soviet allegations of U.S. hostility towards Cuba	6 92 98	1 50 51	3 79 82	2 52 54	3 66 69	1 31 32	0 0 0	2 32 34	2 95 97	1 20 21	21 497 518
5. Soviet agreement to remove their missiles from Cuba	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	1 31 32	0 0 0	1 9 10	0 0 0	0 0 0	2 40 42
6. U.S. threats directed against the Soviets	0 0 0	1 35 36	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	1 35 36
7. Soviet threats directed against the U.S.	2 32 34	2 66 68	0 9[d] 9	2 52 54	2 43 45	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	8 202 210
Total No. of Theme Occurrences on Soviet Radio during the Day	13 235 248	6 200 206	5 154 159	9 257 266	12 232 244	4 115 119	7 93 100	6 113 119	6 197 203	2 40 42	70 1,636 1,706

[a] No. of radio occurrences found in the content analysis.
[b] Additional no. of radio occurrences inferred.
[c] Total no. of radio occurrences.
[d] In the inferential procedure used it sometimes happened that a message occurrence found in the content analysis on day n implied one or more message occurrences on day n+1.

TABLE 8.3.-- Inferred pattern of television appearances for seven themes about the Cuban missile Crisis occurring on Soviet radio, October 23d - November 1st, 1962

Themes Coded	Day 23	24	25	26	27	28	29	30	31	1	Total No. of Television Occurrences of the Theme
1. The U.S. naval quarantine of Cuba	2[a] / 9[b] / 11[c]	1 / 45 / 46	0 / 15[d] / 15	3 / 27 / 30	5 / 96 / 101	1 / 50 / 51	0 / 0 / 0	1 / 1 / 2	1 / 33 / 34	1 / 40 / 41	15 / 316 / 331
2. Reports of pro-Soviet or anti-U.S. reactions	2 / 12 / 14	1 / 28 / 29	1 / 42 / 43	1 / 36 / 37	2 / 50 / 52	1 / 25 / 26	7 / 35 / 42	2 / 44 / 46	2 / 64 / 66	0 / 15[d] / 15	19 / 351 / 370
3. Reports of pro-U.S. or anti-Soviet reactions	1 / 1 / 2	0 / 23[d] / 23	1 / 1 / 2	1 / 25 / 26	0 / 24 / 24	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	1 / 10 / 11	0 / 15[d] / 15	4 / 99 / 103
4. U.S. hostility towards Cuba	6 / 56 / 62	1 / 62 / 63	3 / 52 / 55	2 / 65 / 67	3 / 51 / 54	1 / 60 / 61	0 / 68[d] / 68	2 / 12 / 14	2 / 49 / 51	1 / 55 / 56	21 / 530 / 551
5. Soviet agreement to remove their missiles from Cuba	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	1 / 10 / 11	0 / 9[d] / 9	1 / 11 / 12	0 / 6 / 6	0 / 0 / 0	2 / 36 / 38
6. U.S. threats directed against the Soviets	0 / 0 / 0	1 / 0 / 0[d]	0 / 10[d] / 11[d]	0 / 15[d] / 15	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	1 / 25 / 26
7. Soviets threats directed against the U.S.	2 / 12 / 14	2 / 38 / 40	0 / 26[d] / 26	2 / 41 / 43	2 / 50 / 52	0 / 24[d] / 24	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	8 / 191 / 199
Total No. of Theme Occurrences on Soviet TV During the Day	13 / 90 / 103	6 / 196 / 201[d]	5 / 146[d] / 152[d]	9 / 209 / 218	12 / 271 / 283	4 / 169 / 173	7 / 112 / 119	6 / 68 / 74	6 / 162 / 168	2 / 125 / 127	90 / 1,548 / 1,618

[a] No. of radio occurrences found in the content analysis.

[b] Additional no. of television occurrences inferred.

[c] Total no. of television occurrences.

[d] In the inferential procedure used it sometimes happened that a message occurrence found in the content analysis on day n implied one or more message occurrences on day n+1, sometimes only on day n+1.

over the ten-day period. Although their rank ordering differs between Soviet print and electronic media, in each case "the U.S. Naval Quarantine of Cuba" (theme 1), "Reports of Pro-Soviet or Anti-U.S. Reactions" (theme 2), and "Soviet Allegations of U.S. Hostility Towards Cuba" (theme 4) are the three themes that occur with the greatest frequency. In each case, also, "Soviet Agreement to Remove Their Missiles From Cuba" (theme 5) and "U.S. Threats Directed Against the Soviets" (theme 6) are the two themes that occur with the lowest frequency, and their rank-ordering in this respect is the same between print and electronic media. Lastly, each message schedule shows "Reports of Pro-U.S. or Anti-Soviet Reactions (theme 3) and "Soviet Threats Directed Against the U.S." (theme 7) as the two themes receiving an intermediate level of coverage, with their rank-ordering reversed between print and electronic media.

An overall similarity in theme emphasis between the Soviet print and electronic message schedules synthesized for the Cuban crisis simulation is especially significant in light of the facts that (1) very different definitions of what constituted a unit message occurrence were employed for these two media types, (2) the two content analyses were coded by different persons,[1] and (3) the

[1] The author coded all broadcasts in the content analysis of Soviet radio.

electronic schedules were constructed from a much sparser data base than the print schedule. The fact that a close correspondence in theme emphasis across Soviet newspapers, radio, and television is apparent in spite of these sources of error suggests the high degree of uniformity and coordination that must have characterized coverage of the Cuban crisis in these media.

A second interesting feature of the message schedules constructed for Soviet radio and television is the way they differ from the schedule obtained for the Soviet press with regard to the relative coverage given the three groups of themes discussed above. Figure 6.1 below lists the total number of occurrences of each of these groups of themes in the Soviet press, radio, and television message schedules that were used as inputs for the Cuban crisis simulation.

From this comparison it would appear that all three Soviet media types gave about the same relative attention to the most and least heavily covered groups of themes, but that Soviet electronic media gave comparatively more attention thatn Soviet print media to the

Themes Coded	Message Schedule: Soviet Press	Soviet Radio	Soviet Television
1. The U.S. Naval Quarantine of Cuba 2. Reports of Pro-Soviet or Anti-U.S. Reactions 4. Soviet Allegations of U.S. Hostility towards Cuba	3,794 (86%)[a]	1,312 (77%)	1,252 (78%)
3. Reports of Pro-U.S. or Anti-Soviet Reactions 7. Soviet Threats Directed Against the U.S.	456 (10%)	316 (18%)	302 (18%)
5. Soviet Agreement to Remove Their Missiles from Cuba 6. U.S. Threats Directed Against the Soviets	166 (4%)	78 (5%)	64 (4%)
Total No. of theme Occurrences	4,416	1,706	1,618

Fig. 6.1.--Occurrences of three groups of themes in the Soviet press, radio, and television message schedules that were input to the Cuban crisis simulation

group of themes receiving an intermediate level of coverage. In other words, the results of the content analysis suggest that relative to the other five themes "Reports of Pro-U.S. or Anti-Soviet Reactions" (theme 3) and "Soviet Threats Directed Against the U.S." (theme 7) were somewhat more likely to have occurred in Soviet radio and television broadcasts than in the Soviet press during the Cuban missile crisis.[1]

Finally, we note that the distributions of theme occurrences over crisis days in the message schedules constructed for Soviet electronic media differ considerably from the temporal distribution of theme occurrences in the message schedule generated for the Soviet press. Table 6.1 shows a gradual buildup of theme occurrences to a peak around October 25th-26th followed by a gradual decline thereafter. In contrast, however, theme occurrences in Tables 6.2 and 6.3 exhibit a highly irregular pattern. This difference may be due to the fact that the radio monitoring reports we used to construct Soviet electronic message schedules consisted only of a random sample of the material actually transmitted by the Moscow domestic service during the Cuban crisis period.[2] There is, however, one important exception to the irregular pattern of theme appearances in the message schedules obtained for Soviet radio and television. No occurrences of "Soviet Threats Directed Against the U.S." (theme 7) were recorded on or after October 28th--the day the Soviets

---

[1] Of course, the sparseness of the radio material we content analyzed makes this finding highly speculative. It may reflect the impact of foreign radio in forcing Soviet electronic media to compete for the domestic audience.

[2] See Chap. 1, p. , n. .

agreed to remove their missiles from Cuba. On the other hand, occurrences of this theme in the Soviet press did not begin to subside until the following day, i.e., the 29th. This difference illustrates one advantage continuous media (radio and television) have over discontinuous media (newspapers and magazines) as instruments of policy in Soviet domestic reportage of international crises: they provide greater flexibility and responsiveness.

Foreign radio coverage

Overview

Former Soviet citizens frequently testify that within the USSR the British Broadcasting Corporation is considered a more reliable and accurate source of international news than other foreign radio stations and enjoys greater popularity as a result. BBC transmissions to the USSR during the Cuban crisis period probably were quieter in tone and provided a somewhat more balanced and rational assessment of events than Voice of America or Radio Liberty broadcasts. Unfortunately, the British Broadcasting Corporation does not retain records of their broadcast material for any length of time, so we lack the source data with which to document the qualitative part of this assumption.[1] But transcripts of VOA broadcasts supplied by the United States Information Agency do enable us to describe this station's Cuban crisis coverage.[2]

Beginning on October 23d at 4:30 a.m. Moscow Central Time (only two and one-half hours after President Kennedy's quarantine speech) and continuing for the next several days, virtually every Voice of America broadcast beamed to the USSR was devoted to news about the Cuban missile crisis. Up to this period VOA had been broadcasting six hours a day to the Soviet Union, but on the first day of the Cuban crisis the station added nine special half hour broadcasts to its regular schedule, and on each succeeding day of the crisis, through November 1st, a special half hour broadcast was added to the normal VOA programming.[3]

---

[1]We did receive support for this assumption from our conversation with Leonid Finkelstein.

[2]Transcripts of many of VOA's Russian-language news broadcasts during the Cuban crisis period were not locatable, but it seems safe to assume that they closely resembled VOA's Georgian, Armenian, and Ukrainian broadcasts during the period, copies of which were made available to us by the USIA.

[3]For the scheduling of these additional broadcasts see Appendix B (Table B.15).

On October 23d VOA broadcasts in Ukrainian included a translation of President Kennedy's quarantine speech, an announcement of times when the speech would be rebroadcast, a news analysis entitled "U.S. Action on Cuba Does Not Change Berlin Commitment," a report on reactions to the President's speech in Havana, London, the Netherlands and Argentina, accounts of the personal reactions of Mateos, Mora, Holyoake, Menzies and Brandt, a report on Diefenbaker's call for an impartial inspection of Cuba, a translation of the "Official Statement of the Soviet Government," a description of concurrent measures being taken by N.A.T.O., and an account of ongoing U.S. quarantine efforts. In addition to carrying the text of President Kennedy's Quarantine speech, VOA broadcasts in Georgian on the 23d also included a discussion of the Cuban missile sites, reports of reaction to the President's speech in London and Bonn, accounts of the personal reactions of former President Truman as well as Republican and Democratic Party leaders, and the news analysis referred to above. VOA Armenian broadcasts on the 23d included a translation of President Kennedy's speech and a special news roundup of Cuban crisis developments.

Russian-language broadcasts carried by VOA on October 23d included a translation of President Kennedy's address, a summary of White House activity and other U.S.

actions in connection with the quarantine, a roundup of world reaction to President Kennedy's decision on Cuba, a report on the convocation of the U.N. Security Council, a translation of Secretary Rusk's statement to the O.A.S. Council, a news analysis of the U.S.'s Berlin commitment (referred to above), a report on continuing N.A.T.O meetings, a discussion of Soviet-controlled Cuban missile sites, a late-evening report on U.N. proceedings, an announcement of West German support for the American quarantine action, and a news analysis entitled "The Cuban Quarantine: President Kennedy's Speech."

On October 24th VOA Georgian broadcasts included a translation of President Kennedy's quarantine proclamation, a report on the extension of U.S. Navy and Marine Corps duty, an account of the U.N. Security Council session--including Ambassador Stevenson's call for the withdrawal of Soviet missiles from Cuba and Soviet Ambassador Zorin's statement in reply, a report on OAS approval of the quarantine proclamation, an American resolution on Cuba, reports on Argentinian, Colombian, Netherlands, and West German endorsement of the quarantine, an account of Soviet cancellation of armed forces leaves and Cuban war mobilization moves, textual excerpts from President Kennedy's speech, and a review of U.S. press comment regarding President Kennedy's action on Cuba.

In addition to news of the quarantine proclamation, U.N. and OAS proceedings, Western allied support for U.S. actions, and U.S press comment on Cuba, VOA's American broadcasts on the 24th included an account of President Kennedy's meeting with Congressional leaders, Eisenhower's call for domestic support of the President, a review of the information on Cuban missiles that had been released by the Pentagon, and a rebroadcast of the news analysis concerned with the U.S.'s Berlin commitment.

VOA Ukrainian broadcasts on October 24th included, in addition to most of the reports mentioned above, an account of U.S. activities in connection with enforcement of the quarantine and an allegation that no Cubans were allowed on Soviet rocket sites in Cuba.

VOA's Georgia, Armenian, Ukrainian and Russian broadcasts on October 25th each consisted of a repeat broadcast of President Kennedy's quarantine speech and a comprehensive roundup of crisis developments. The latter included Defense Department reports of some Soviet Cuban-bound ships having altered course while others were still proceeding toward the island, a review of the latest reactions in London, the Vatican, and Canada, an account of Soviet Defense Minister Malinovsky's speech (which had appeared in Krasnaya zvezda) describing the battle readiness of Soviet Armed Forces as well as their intercontinental ballistic missile capabilities, a report on Bertrand Russel's correspondence with Kennedy and Khrushchev and the latter's reply, a discussion of Defense Department allegations regarding the Soviet force configuration in Cuba, U Thant's first appeal to the U.S. and USSR for joint conciliatory action, an account of the day's U.N. proceedings, a report on the Washington announcement that American Republics were offering the U.S. military help in the quarantine enforcement, the announcement that an American naval vessel had intercepted a Soviet tanker bound for Cuba but had allowed it to proceed after discovering that it was carrying only petroleum, and a review of the domestic political and popular support for President Kennedy's Cuban policy.

On October 26th the VOA's Georgian broadcasts included a report on U.N. Proceedings which covered Stevenson's presentation of photographic evidence and his verbal exchange with Zorin, a translation of a White House statement on the gravity of the world situation and the search of a Soviet tanker, a translation of the TASS-reported Soviet Government statement on the quarantine, Mayor Brandt's comments on the U.S. pledge to maintain its Berlin commitment, a review of U.S. press comment on Kremlin reaction to the quarantine, and a political analysis entitled "U.S. Political Solidarity on Cuba."

Armenian broadcasts carried by VOA on the 26th included a report that U Thant was holding private talks on Cuba, an account of U.N. proceedings, the White House statement referred to above, Mayor Brandt's statement, an offer of help from Prime Minister MacMillan, a news analysis entitled "Cuba and the Lesson of History," and a roundup of world press commentary on Cuba.

VOA's Ukranian broadcasts on the 26th included a report that the U.S Navy had intercepted a Libyan freighter under Soviet Charter, the announcement of Khrushchev's pledge to keep Cuban-bound ships out of the quarantine zone, a report that the U.S. and USSR had accepted U Thant's call for discussions, a rebroadcast of Jose Mora's statement on Cuba, and most of the news reports that were carried in the Georgian and Armenian broadcasts.

On October 27th Georgian VOA broadcasts included translations of Khrushchev's and Kennedy's replies to U Thant's second appeal, Press Secretary Salinger's statement that Cuban missile sites were still under rapid construction, the State Department's reiteration of President Kennedy's warning, Kennedy's reply to Bertrand Russell, a report on the Moscow demonstration outside the U.S. embassy, reactions to the Cuban crisis by Jose Mora and Konrad Adenauer, an account of the searching and passing of a Lebanese freighter, a report on U.N. proceedings, a news analysis entitled "No Soviet Answer to a Simple Question," and a political analysis entitled "The Atmosphere in Washington."

In addition to many of the reports carried in Georgian broadcasts, the VOA's Armenian broadcasts included statements of support for the U.S. stand from Japan as well as Asian, Latin American and European countries, the text of Khrushchev's letter to Kennedy offering to remove Soviet missiles from Cuba in exchange for the dismantling of U.S. bases in Turkey (first broadcast at 17:30 Moscow Central Time on the 27th), Press Secretary Salinger's remarks on Khrushchev's letter, and a news analysis entitled "Cuba--the First Stage of a Major Showdown."

In addition to most of the Georgian and Armenian broadcasts VOA material transmitted to the Ukraine on the 27th included an analysis of Khrushchev's proposed Cuba-Turkey exchange which was characterized as a Moscow admission that there were "offensive weapons in Cuba," an announcement that the U.S. would continue the quarantine while attempting to avoid direct confrontations, and a rebroadcast of the preceding day's political analysis: "U.S. Political Solidarity on Cuba."

On October 28th VOA's Georgian broadcasts included Kennedy's letter to Khruschev in which the proposed Cuba-Turkey exchange was rejected as unacceptable, a report that a U.S. reconnaissance plane was missing over Cuba, an announcement of the U.S. reserve call-up, a report on Defense Secretary McNamara's ordering of twenty-four troop carrier squadrons of the air force reserve into active duty, the text of Khrushchev's announcement that he had given orders to dismantle Cuban missile sites under U.N. supervision (first broadcast at 5:30 Moscow Central Time on the 28th), a report that Castro had invited U Thant to Cuba to discuss implementation of the arms removal, and a guest analysis entitled "Weapons in Place: The Real Point."

In addition to the Georgian broadcasts referred to above, VOA's Armenian and Ukrainian broadcasts on the 28th also included an account of Venezuelan mobilization activity, and the Ukrainian broadcasts carried an earlier White House statement that work on Soviet missile sites in Cuba was still proceeding, a translation of President Kennedy's second letter to U Thant, a report on the State Department's system of clearances for ships in the quarantine area, rebroadcasts of the two news analyses: "No Soviet Answer to a Simple Question" and "U.S. Political Solidarity in Cuba," and the text of President Kennedy's letter to Bertrand Russell.

On October 29th VOA's Georgian broadcasts carried the text of President Kennedy's reply to Khrushchev's letter announcing the dismantling of Soviet missile bases in Cuba, a report on U Thant's planned trip to Cuba, a State Department announcement that the U.S. would not accede to Castro's demand to give up the Guantanamo naval base, a report that Secretary of State Rusk had briefed Latin American Ambassadors on the latest crisis developments, and the text of a Defense Department allegation that work on the dismantling of Soviet missile bases in Cuba had not yet begun. In addition to this material VOA's Armenian broadcasts also carried the text of Prime Minister Mac Millan's message to Khrushchev congratulating the Soviet Premier on his statesmanlike action, a news analysis entitled "The President's Response to Khrushchev's statement," a review of commentary in the New York Times, the New York Herald Tribune, the Washington Post, and the Philadelphia Enquirer entitled "On Latest Developments in the Cuban Crisis," and a report that U Thant had arranged for a second round of conferences with U.S. and Soviet representatives before proceeding on his trip to Havana.

In addition to most of the material carried by VOA's Georgian and Armenian broadcasts on the 29th, Ukrainian broadcasts carried a report on Ambassador Stevenson's first conference with U Thant, a rebroadcast of news about Venezuelan mobilization activity, a rebroadcast of the political analysis: "The Cuban Crisis Reviewed," and the text of a State Department allegation that the sabotage in Venezuela had been ordered by Castro.

On October 29th VOA's Georgian and Armenian broadcasts carried a report that President Kennedy had suspended the quarantine for the two days during which U Thant was to be in Cuba and had named a three-man committee to assist Ambassador Stevenson in the U.N. negotiations, a report on U Thant's departure for Cuba, the news that Swedish officers had been chosen for the U.N. observer team which would verify the missile withdrawal, a rebroadcast of the State Department's announcement on Guantanamo and its allegation of Castro-sponsored sabotage and subversion in Latin America, the text of a speech by former President Eisenhower warning that the U.S. should not relax its vigilance in spite of an apparent Soviet retreat, and a diplomatic correspondent's report noting that while Washington welcomed the Moscow move many problems still remained. In addition to this material Georgian broadcasts carried a report that President Kennedy would hold a news conference the following day, a report on Washington preparations for an Adenauer visit, and a review of the latest editorial comment on the Cuban crisis in the U.S. press. Armenian broadcasts also included a news analysis entitled "Why Washington Takes the Cautious View."

On October 30th VOA's Ukrainian broadcasts carried, in addition to much of the material transmitted in the Georgian and Armenian broadcasts, a statement by Defense Undersecretary Sylvester that no new Soviet ships were presently approaching the quarantine zone, a review of Washington reaction to Khrushchev's move on Cuba, a report on continuing Defense Department surveillance over Cuba, news of U Thant's meeting with Kusnetzov, Stevenson, Mc Cloy and Garcia, a report of the President's having met twice with the National Security Council, a correspondent's report entitled "The President Lifts the Quarantine," news of U Thant's arrival in Havana, an account of a VOA interview with U.S Assistant Secretary for Inter-American Affairs, Edwin Martin, in which Martin claimed that the Castro regime would risk losing Soviet economic support if it hindered U.N. verification of the missile base removal, a roundup of world leaders' reactions to the Soviet missile withdrawal agreement, an analysis of the significance of Soviet acceptance of international inspection in Cuba, and a news analysis entitled "Cuba Continues a Regional Problem."

On October 31st VOA's Georgian, Armenian and Ukrainian broadcasts carried accounts of U Thant's meetings with Castro, further reports of the U.S. suspension of the quarantine at U Thant's request, a report that American air surveillance of Cuba would be suspended for the duration of Thant's stay in Cuba, and a news analysis entitled "The Unfinished Tasks." In addition to this material VOA's Georgian transmissions carried a rebroadcast of the interview with Assistant Secretary Martin. Armenian broadcasts also included a speech by Harold Mac Millan in which the Prime Minister praised allied governments for their firm attitude during the crisis, and a correspondent's report on President Kennedy's lifting of the quarantine. Ukrainian broadcasts also included this speech as well as a roundup of U.S. press commentary entitled "U.S Press Takes a Longer View at the Cuban Developments." Ukrainian broadcasts also carried late-evening/early-morning (Moscow time) reports that U Thant and all his aides were returning to New York from Cuba, that Mikoyan was to visit Cuba, a speech by Lord Hume praising President Kennedy and attacking Soviet deception, and lastly a report that DeGaulle had been kept up to date on Cuban crisis developments by U.S. officials.

Results of the content analysis

We have content analyzed transcripts of the material broadcast by Voice of America and Radio Liberty during the ten-day Cuban crisis period covered by the simulation. Also, as a surrogate for British Broadcasting Corporation broadcasts, we have content analyzed issues of the London Times published during this period. Approximately 1,100 foreign radio broadcasts and 1,000 newspaper articles were coded for each of the seven themes referred to above. VOA and Radio Liberty broadcasts were also coded for the hour of day during which they occurred. From the thematic treatment of the Cuban crisis in the material content analyzed we inferred a pattern of theme appearances over all the broadcasts beamed to the Soviet Union by VOA, Radio Liberty, and the BBC during this period. The broadcast schedules and assumptions used in making these inferences are included in Appendix B (Tables B.15, B.17, B.18, B.19, B.20 and B.22).

Tables 6.4-6.6 summarize the message schedules obtained by spreading theme appearances in the content analyzed material over all nine foreign radio media in the simulation. For the seven themes they show estimated totals of 994 theme occurrences in three Voice of America media, 392 theme occurrences in three British Broadcasting Corporation media, and 5,175 theme occurrences in three Radio Liberty media.[1] These differences in total

[1] For the portions of the day which each of these nine media span see Appendix B (Tables B17, B.19, and B.22).

TABLE 6.4.-- Content analysis for seven themes about the Cuban missile crisis occurring on Voice of America broadcasts to the Soviet Union, October 23d - November 1st, 1962

Theme Coded	Day 23	24	25	26	27	28	29	30	31	1	Total No. of VOA Occurrences of the Theme
1. The U.S. naval quarantine of Cuba	34[a] / 0[b] / 34[c]	5 / 18 / 23	8 / 18 / 26	4 / 28 / 32	8 / 24 / 32	6 / 16 / 22	7 / 10 / 17	5 / 9 / 14	4 / 10 / 14	6 / 19 / 25	87 / 152 / 239
2. Reports of pro-Soviet or anti-U.S. reactions	0 / 0 / 0	5 / 18 / 23	3 / 11 / 14	0 / 1[d] / 1	4 / 9 / 13	0 / 1[d] / 1	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	1 / 5 / 6	13 / 45 / 58
3. Reports of pro-U.S. or anti-Soviet reactions	11 / 1 / 12	7 / 18 / 25	3 / 11 / 14	6 / 20 / 26	7 / 20 / 27	9 / 31 / 40	2 / 1 / 3	0 / 0 / 0	3 / 9 / 12	2 / 6 / 8	50 / 117 / 167
4. Soviet allegations of U.S. hostility towards Cuba	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0
5. Soviet agreement to remove their missiles from Cuba	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	3 / 28 / 31	14 / 29 / 43	11 / 24 / 35	6 / 21 / 27	4 / 11 / 15	38 / 113 / 151
6. U.S. threats directed against the Soviets	40 / 4 / 44	2 / 11 / 13	3 / 10 / 13	3 / 11 / 14	6 / 20 / 26	2 / 6 / 8	4 / 10 / 14	0 / 1[d] / 1	4 / 9 / 13	0 / 1[d] / 1	64 / 83 / 147
7. Soviet threats directed against the U.S.	43 / 2 / 45	7 / 18 / 25	6 / 20 / 26	5 / 21 / 26	6 / 22 / 28	3 / 18 / 21	8 / 18 / 26	3 / 11 / 14	4 / 10 / 14	1 / 6 / 7	86 / 146 / 232
Total No. of Theme Occurrences on VOA During the Day	128 / 7 / 135	26 / 83 / 109	23 / 70 / 93	18 / 81 / 99	31 / 95 / 126	23 / 100 / 123	35 / 68 / 103	19 / 45 / 64	21 / 59 / 80	14 / 48 / 62	338 / 656 / 994

[a] No. of VOA occurrences found in the content analysis.

[b] Additional no. of VOA occurrences inferred.

[c] Total no. of VOA occurrences.

[d] In the inferential procedure used it sometimes happened that a message found in the content analysis in day n implied one or more message occurrences on day n+1.

TABLE 6.5.-- Inferred pattern of British Broadcasting Corporation occurrences of seven themes about the Cuban missile crisis appearing in the London Times, October 23d – November 1st, 1962

Themes Coded	Day 23	24	25	26	27	28	29	30	31	1	Total No. of BBC Occurrences of the Theme
1. The U.S. naval quarantine of Cuba	2[a] / 14[b] / 16[c]	1 / 7 / 8	1 / 7 / 8	0 / 0 / 0	1 / 7 / 8	1 / 7 / 8	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	1 / 7 / 8	7 / 49 / 56
2. Reports of pro-Soviet or anti-U.S. reactions	0 / 0 / 0	3 / 21 / 24	2 / 14 / 16	1 / 7 / 8	2 / 14 / 16	0 / 0 / 0	2 / 14 / 16	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	10 / 70 / 80
3. Reports of pro-U.S. or anti-Soviet reactions	0 / 0 / 0	2 / 14 / 16	2 / 22 / 24	1 / 7 / 8	4 / 28 / 32	0 / 0 / 0	3 / 21 / 24	1 / 7 / 8	1 / 7 / 8	0 / 0 / 0	14 / 106 / 120
4. Soviet allegations of U.S. hostility towards Cuba	0 / 0 / 0	1 / 7 / 8	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	1 / 7 / 8
5. Soviet agreement to remove their missiles from Cuba	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	3 / 21 / 24	1 / 7 / 8	0 / 0 / 0	0 / 0 / 0	4 / 28 / 32
6. U.S. threats directed against the Soviets	2 / 14 / 16	0 / 0 / 0	0 / 0 / 0	1 / 7 / 8	1 / 7 / 8	1 / 7 / 8	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	5 / 35 / 40
7. Soviet threats directed against the U.S.	0 / 0 / 0	4 / 28 / 32	0 / 0 / 0	0 / 0 / 0	1 / 7 / 8	2 / 14 / 16	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	7 / 49 / 56
Total No. of Theme Occurrences on BBC during the Day	4 / 28 / 32	11 / 77 / 88	5 / 43 / 48	3 / 21 / 24	9 / 63 / 72	4 / 28 / 32	8 / 56 / 64	2 / 14 / 16	1 / 7 / 8	1 / 7 / 8	48 / 344 / 392

[a] No. of London Times occurrences found in the content analysis. [c] Total no. of BBC occurrences.
[b] Additional no. of BBC occurrences inferred.

TABLE 6.6.— Content analysis for seven themes about the Cuban missile crisis occurring on Radio Liberty broadcasts to the Soviet Union, October 23d – November 1st, 1962

Theme Coded	Day 23	24	25	26	27	28	29	30	31	1	Total No. of RL Occurrences of the Theme
1. The U.S. naval quarantine of Cuba	4[a] / 87[b] / 91[c]	8 / 161 / 169	8 / 187 / 195	8 / 205 / 213	8 / 171 / 179	5 / 88 / 93	3 / 72 / 75	3 / 55 / 58	2 / 59 / 61	1 / 19 / 20	50 / 1,124 / 1,174
2. Reports of pro-Soviet or anti-U.S. reactions	2 / 28 / 30	5 / 110 / 115	3 / 47 / 50	1 / 22 / 23	3 / 46 / 49	1 / 14 / 15	2 / 78 / 80	2 / 34 / 36	4 / 110 / 114	3 / 47 / 50	26 / 536 / 562
3. Reports of pro-U.S. or anti-Soviet reactions	3 / 74 / 77	8 / 189 / 197	8 / 155 / 163	4 / 123 / 127	6 / 139 / 145	5 / 125 / 130	3 / 78 / 81	5 / 153 / 158	4 / 61 / 65	0 / 0 / 0	46 / 1,097 / 1,143
4. U.S. hostility towards Cuba	2 / 43 / 45	2 / 21 / 23	1 / 45 / 46	2 / 64 / 66	2 / 51 / 53	1 / 14 / 15	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	10 / 238 / 248
5. Soviet agreement to remove their missiles from Cuba	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	0 / 0 / 0	3 / 65 / 68	7 / 205 / 212	10 / 218 / 228	9 / 216 / 225	4 / 63 / 67	33 / 767 / 800
6. U.S. threats directed against the Soviets	3 / 51 / 54	4 / 91 / 95	3 / 78 / 81	2 / 64 / 66	1 / 19 / 20	0 / 0 / 0	1 / 45 / 46	1 / 19 / 20	1 / 45 / 46	1 / 19 / 20	17 / 431 / 448
7. Soviet threats directed against the U.S.	4 / 96 / 100	8 / 180 / 188	6 / 136 / 142	3 / 43 / 46	2 / 55 / 57	3 / 97 / 100	3 / 78 / 81	1 / 19 / 20	1 / 45 / 46	1 / 19 / 20	32 / 768 / 800
Total No. of Theme Occurrences on RL During the Day	18 / 379 / 397	35 / 752 / 787	29 / 648 / 677	20 / 521 / 541	22 / 481 / 503	18 / 403 / 421	19 / 576 / 595	22 / 498 / 520	21 / 536 / 557	10 / 167 / 177	214 / 4,961 / 5,175

[a] No. of RL occurrences found in the content analysis. [c] Total no. of RL occurrences.
[b] Additional no. of RL occurrences inferred.

coverage reflect the fact that, in 1962, VOA's Russian broadcasts totalled six and one-half hours a day while the BBC's daily Soviet broadcasts lasted only about half this long and Radio Liberty was transmitting material to the USSR around the clock. As one might expect, the three foreign radio message schedules emphasize, for the most part, the American events and play down the Soviet side of the quarantine story. In each schedule "The U.S. Naval Quarantine of Cuba" (theme 1), "Reports of Pro-U.S. or Anti-Soviet Reactions" (theme 3), and "Soviet Threats Directed Against the U.S." (theme 7) rank as the three most frequently occurring themes, while "Soviet Allegations of U.S. Hostility towards Cuba" (theme 4) is the theme that occurs with the lowest frequency in each case.

Differences across the three message schedules obtained for foreign radio are perhaps more worthy of note. Theme 5, "Soviet Agreement to Remove Their Missiles from Cuba," occurs with a lower relative frequency in the BBC message schedule that it does in the VOA and BBC schedules, and theme 2, "Reports of Pro-Soviet or Anti-U.S. Reactions," occurs with a greater relative frequency in the BBC message schedule than in either of the other two schedules. These differences conform to the assumption of a somewhat more balanced treatment of the crisis by the British Broadcasting Corporation than by either of the other two stations. "Reports of Pro-Soviet or Anti-U.S. Reactions" (theme 2) constitute over ten per cent of the total theme occurrences in the message schedule obtained for Radio Liberty but only about five per cent of the total theme occurrences in VOA's schedule. Also, there were no occurrences of theme 4, "Soviet Allegations of U.S. Hostility Towards Cuba," in the message schedule obtained for VOA, whereas this theme constitutes about five per cent of the messages in the Radio Liberty schedule. Lastly, "Soviet Threats Directed Against the U.S." (theme 7) appeared in about twenty-five per cent of the total messages in the VOA schedule but only in about fifteen per cent of the total messages in the Radio Liberty schedule. While these differences are modest they do suggest that, at least during the Cuban crisis period, VOA's broadcasts were more one-sidedly pro-American than Radio Liberty's, a finding which runs counter to the generally assumed pattern.[1]

---

[1] Our content comparisons across the three major foreign radio stations have to be regarded as highly speculative for the following reasons: (1) the content of BBC broadcasts had to be inferred from London Times issues; (2) Coding reliability and validity were probably somewhat lower in the content analyses done for foreign radio than in the content analyses done for the Soviet media in the simulation. The author coded VOA transcripts, but the Radio Liberty microfilmed newsscripts were translated and coded by a German-reading research assistant and the London Times issues were coded by a second research assistant. Due to the pressures of the research schedule,

It is interesting also to compare the message schedules obtained for foreign radio with those obtained for Soviet print and electronic media. To facilitate this comparison we have divided the seven themes into four groups: a group representing the Soviet side of the issue (themes 2 and 4); a group representing the American version of events (themes 3, 7, and 5); the quarantine theme (theme 1), because it received relatively heavy coverage in the Soviet domestic and foreign radio media; "U.S. threats directed against the Soviets" (theme 6), because this theme received relatively light coverage in Soviet media and foreign radio transmissions. Figure 6.2 compares the total number of occurrences of each of these themes or groups of themes in the message schedules obtained for Soviet media and foreign radio. It can be seen that well over half the theme occurrences in the Soviet message schedules (57%) are related to the Russian side of the quarantine story while only sixteen per cent pertain to the Western version of events. Foreign radio message schedules, on the other hand, show exactly the opposite pattern, with over half their theme occurrences (53%) related to the American side of the quarantine story and

---

it was not possible to give these two assistants the extensive training that had been given the assistant who content analyzed Soviet newspapers.

Message Schedule

Themes Coded	Soviet Media	Press	Radio	TV	Foreign Radio	BBC	RL	VOA
2. Reports of pro-Soviet or anti-U.S. reactions 4. Soviet allegations of U.S. hostility towards Cuba	4,339 (57%)*	2,480 (56%)	938 (55%)	921 (57%)	956 (15%)	88 (23%)	810 (15%)	58 (6%)
1. The U.S. naval quarantine of Cuba	2,019 (26%)	1,314 (30%)	374 (22%)	331 (20%)	1,419 (22%)	56 (14%)	1,174 (23%)	239 (24%)
3. Reports of pro-U.S. or anti-Soviet reactions 7. Soviet threats directed against the U.S. 5. Soviet agreement to remove their missiles from Cuba	1,263 (16%)	565 (13%)	358 (21%)	340 (21%)	3,501 (53%)	208 (53%)	2,743 (53%)	550 (55%)
6. U.S. threats directed against the Soviets	119 (1%)	57 (1%)	36 (2%)	26 (2%)	635 (10%)	40 (10%)	448 (9%)	147 (15%)
Total No. of Theme Occurrences	7,740	4,416	1,706	1,618	6,561	392	5,175	994

*Percentage of the total no. of theme occurrences in the media type or group.

Fig. 6.2.--Occurrences of four groups of themes in the message schedules input to the Cuban crisis simulation for Soviet press, radio, TV, and foreign radio.

only fifteen per cent reflecting the Russian version. Figure 6.2 also provides further evidence of two patterns remarked on above: relatively more coverage of the American side of the issue in Soviet electronic media than in Soviet print media; relatively more attention to the Russian point of view in the BBC message schedule than in that of Radio Liberty, and more attention to the Russian side in the Radio Liberty message schedule than in that of VOA. Finally, it is interesting to note that the comparatively greater one-sidedness of the press among the Soviet media and of VOA among foreign radio is further suggested by the greater relative emphasis which each of these media types gives to the details of the quarantine and, in the case of VOA, to anti-Soviet threats made by the United States.

The message schedule

Table 6.7 shows the message schedule used for the Cuban crisis simulation. It simply combines the schedules obtained for the Soviet press, radio, and television, and for Voice of America, Radio Liberty, and the British Broadcasting Corporation. To sum up, the content analyses from which these schedules were derived covered a sample of the material that appeared during the Cuban

TABLE 6.7.-- Message schedule for the Cuban crisis simulation, October 23d - November 1st, 1962

Themes Coded	Day 23	24	25	26	27	28	29	30	31	1	Total No. of Occurrences of the Theme
1. The U.S. naval quarantine of Cuba	44[a] 166[b] 210[c] (196)[d]	108 328 436 (428)	152 365 517 (510)	127 480 607 (599)	109 502 611[e] (0)[f]	100 276 376 (0)	13 107 120 (0)	65 182 247 (0)	32 189 221 (0)	25 125 150 (0)	775 2,720 3,495 (1,733)
2. Reports of pro-Soviet or anti-U.S. reactions	10 75 85	108 263 371 (362)	159 248 407 (402)	178 222 400 (399)	121 265 386[e] (381)	79 134 213 (0)	27 228 255 (0)	92 201 293 (0)	98 305 403 (0)	77 110 187 (0)	949 2,051 3,000 (1,629)
3. Reports of pro-U.S. or anti-Soviet reactions	16 99 115 (112)	43 265 308 (300)	43 239 282 (276)	34 223 257 (250)	49 238 287 (277)	42 174 216 (207)	11 105 116 (113)	33 178 211 (207)	16 131 147 (0)	7 21 28 (0)	294 1,673 1,967 (1,742)
4. Soviet allegations of U.S. hostility towards Cuba	30 209 239	111 189 300 (271)	123 252 375 (347)	106 253 359 (332)	78 234 312[e] (295)	85 151 236 (0)	2 71 73 (0)	50 95 145 (0)	21 165 186 (0)	16 82 98 (0)	622 1,701 2,323 (1,484)
5. Soviet agreement to remove their missiles from Cuba	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	8 134 142 (139)	28 266 294 (282)	60 295 355 (348)	23 267 290 (284)	14 77 91 (88)	133 1,039 1,172 (1,141)
6. U.S. threats directed against the Soviets	45 69 114 (109)	23 150 173 (170)	10 107 117 (114)	8 99 107 (103)	13 49 62 (55)	5 13 18 (17)	5 55 60 (59)	2 20 22	6 54 60 (57)	1 20 21	118 636 754 (716)
7. Soviet threats directed against the U.S.	51 142 193 (181)	51 347 398 (388)	28 199 227 (222)	23 162 185 (179)	16 182 198 (191)	21 166 187 (184)	11 96 107 (102)	4 39 43 (39)	5 55 60 (58)	2 25 27 (25)	212 1,413 1,625 (1,569)
Total No. of Theme Occurrences during the Day	196 760 956 (913)	444 1,542 1,986 (1,919)	515 1,410 1,925 (1,871)	476 1,439 1,915 (1,862)	386 1,470 1,856 (1,199)	340 1,048 1,388 (547)	97 928 1,025 (554)	306 1,010 1,316 (616)	201 1,166 1,367 (399)	142 460 602 (134)	3,103 11,233 14,336 (10,014)

[a] Number of theme occurrences found in the content analyses.

[b] Additional number of theme occurrences inferred.

[c] Estimated total number of theme occurrences.

[d] The simulation constrains the allowable ratios of average theme exposure probabilities across the levels of any dimension as a function of the largest format factor assigned to any message in the scenario (see Chapter III, pp. –). As a result, 333 of the estimated 14,336 occurrences of the seven themes, because they had extremely large format factors, had to be omitted in constructing the message schedule for the scenario so that the simulation would accept realistic ratios of average theme-exposure probabilities. The values in parentheses are ~~(over)~~

TABLE 6.7--Continued

the reduced scenario values.

[e] We have assumed that members of the Soviet population who would have attended oral agitation meetings attended, on the average, one such meeting during the ten-day period encompassed by the Cuban crisis simulation (see Chapter I, p. , n. and, also, Rogers "The Soviet Audience", p. 186, for evidence bearing on this point). We have also assumed that the bulk of Soviet oral agitation meetings during the Cuban crisis period occurred on the 27th, the day on which tension in the USSR is reported to have reached a peak, and we have arbitrarily set the thematic content of these meetings equal to the thematic content of Pravda on the 27th. As a result, the estimated total number of occurrences for each of themes 1, 2, and 4 includes, respectively, 8, 20, and 7 oral agitation occurrences. (Each oral agitation message was arbitrarily assigned the format factor that had been assigned to short news items appearing in Pravda, the latter being the most common format for newspaper stories.)

[f] The simulation allows a maximum of 1,800 occurrences of any single theme in a scenario. For this reason 3,989 of the estimated 14,336 occurrences of the seven themes had to be omitted in constructing the message schedule for the scenario. For each theme the zeroes in parentheses indicate time periods for which the simulation could not accept messages as a result of this constraint. Even though the omission of messages was not distributed evenly across individual themes, it did not affect the validity of the simulation results, for the following reasons: No messages had to be omitted during the first four time periods; The simulation results indicate that by the end of this interval the population had been saturated with exposure to each of the themes in question; Our analysis of the simulation results for each theme is confined to the pre-saturation period.

crisis period in twenty-eight of the fifty-six media conceptualized in the simulation. Approximately 12,200 different articles and broadcasts were coded in all (including the broadcasts duplicated for the television content inference) resulting in a total of 3,103 occurrences of the seven themes in the twenty-eight media. Combining the content analyses with print periodicities and broadcast schedules we inferred an additional 11,233 occurrences of the seven themes in these and the other twenty-eight simulated media, resulting in an estimated total of 14,336 occurrences of the seven themes in the fifty-six simulated media over the ten-day Cuban crisis period.

Changes in Soviet Habits of Media Use And Message Response Triggered by the Crisis

From our discussion in Chapter III the reader will recall that in simulating a computer population's exposure to the messages in a given media system there is an important option which the researcher can exercise: In order to account for changing levels of interest in themes over the period encompassed by a simulation, the researcher can superimpose dynamic potentialities on the computer population's stable habits of media use and message response. For this purpose he is allowed to specify one or more patterns of change in individual exposure probabilities--as a function either of previous theme exposure or the passage of time. Each such modification must be identified by (1) its direction and magnitude, (2) the types of media for which it applies, (3) the subset of population types or cells over which it acts, and (4) the types of probabilities to which it applies. We now proceed to describe how dynamics of this kind were specified for the Soviet media system in the Cuban crisis simulation.

We chose to account for the Soviet population's changing level of interest in themes about the Cuban missile crisis by modifying individual exposure probabilities as a function of time, i.e., as a function of the stage of the scenario, rather than on the basis of individual exposure histories. This choice was dictated more by convenience than anything else. The only data we had on changes in Soviet media-consumption and message-response behavior during the Cuban crisis period were qualitative in nature and were organized in terms of various stages of the crisis. From Buzek's treatment of Soviet press coverage and our interview with Finkelstein we were able to piece together the following picture: The élite strata of Soviet society--i.e., the better-educated and the more politically involved--appear to have been aware of the seriousness of the crisis and to have become active information-seekers from the very first day. Among the broad masses of the population, however, interest probably did not rise sharply until four days after Kennedy's speech (October 26th), when the Government's widely publicized "brink of war" reaction to boardings of Soviet ships apparently triggered widespread panic within the USSR. This crisis atmosphere persisted and perhaps even intensified somewhat on the 27th. On October 28th, however, the Russian people learned of their Government's agreement to dismantle the Cuban missile bases. From this point on, interest in crisis themes seems to have subsided among all strata of the population, and patterns of media consumption and theme response appear to have returned to normal fairly rapidly as the intensity of the crisis receded.

There seem to have been two different levels of awareness within the USSR during the Cuban crisis. The poorer-educated less politically involved segments of the Soviet population apparently exhibited a more diffuse type of interest, their concern and arousal focusing mainly on the prospect of war, while the better-educated and politically sophisticated probably were more aware of and interested in the details and complexities of the actual confrontation.

To reflect the foregoing dynamics in the Cuban crisis scenario we specified the probability modifications described in Figure 6.3.[1]

In the present version of the simulation all probability changes which are specified as a function of time period must occur with the same time phasing. This constraint prevented us from initiating "modification #1" on October 23d, although we would have preferred it to begin on this date to reflect the fact that the crisis triggered the interest of the better-educated portion of the population almost immediately. It is worth noting, however, that the inaccuracy produced by "pulsing" the probabilities of all population types at the same stage of the scenario probably was rather small. The better-educated segments of the Soviet population were media-saturated to begin with, so any crisis-generated increments in their normal exposure probabilities could

---

[1] Recalling our discussions of probability modifications in Chapter III, the reader will note that by specifying October 25th as the day on which each probability increase started and October 27th as the day on which it reached its full extent, we insured that there would be no probability increments on the 25th and only half of the full increments would take affect on the 26th. Similarly, by specifying October 27th as the day on which each probability increase began to recede and November 1st as the day on which it no longer existed, we insured that the probability increments would have their full effects on the 27th and diminish in five equal steps each day thereafter until, on November 1st, they would no longer have any effect.

Time phasing of all probability modifications

Modification Starts to Take Effect: October 25th (T=3)

Modification has Its Full Effect: October 27th (T=5)

Modification Starts to Recede: October 27th (T=5)

Modification No Longer Has Any Effect: November 1st (T=10)

	Modification #1	Modification #2
Direction and Magnitude:	Normal p: 0.0, 0.5; New p: 0.2, 0.6	Normal p: 0.0, 0.5; New p: 0.2, 0.6
Types of Media Affected:	Newspapers, Television, Radio, Foreign Radio, Oral Agitation	Radio, Foreign Radio, Oral Agitation
Types of Persons Affected:	Those with >10 yrs. ed.; Those with $\geq$ 7,$\leq$10 yrs. ed.	Those with $\geq$4,<7 yrs. ed.; Those with <4 yrs. ed.
Types of Probabilities Affected:	Message Exposure	Message Exposure

Fig. 6.3--. Changes in Soviet message exposure probabilities hypothesized for the Cuban crisis simulation

only amount to relatively small percentages of these base probabilities. (We discussed this "ceiling effect" phenomenon in Chapter III, pp. - .)[1] As for the magnitude of change in individual media exposure probabilities, both modifications specify, somewhat arbitrarily, that persons who normally had a 50-50 chance of being exposed to a particular type of message in a given type of medium were twenty per cent more likely to have been exposed to such messages at the high point of their interest in the crisis, and that persons who would not normally have noticed a particular type of message in a given type medium were likely to have noticed one out of every five such messages at the peak of their interest in the crisis.[2]

The reader will recall from our discussion of probability modifications in Chapter III that the simulation

---

[1] We applied probability modifications to population types defined in terms of education alone because (1) this variable has the strongest correlation with differences in media-use behavior in the USSR, and (2) our qualitative data on changing levels of interest during the crisis are not sufficiently detailed to suggest comparative hypotheses about cross-classified Soviet population types.

[2] The magnitudes of the increases in 0.0 and 0.5 probabilities which we specified are purely experimental. Comcom data provide some information on how Soviet citizens increase their information-seeking in gernral, and their media consumption in particular, during crisis situations. The relevant questions are phrased as follows:

> Now...I want to...consider two crisis periods while you were still in the Soviet Union. I'd like to see what you did differently at that time.
>
> Did you read any more newspapers? (Yes, No)
> If yes: Which ones?
>
> Did you use the radio any more or frequently?
> How?
>
> Did you seek other sources of information?
> If yes: What sources?

While the answers to these questions are interesting in their own right, it is not readily apparent how they can be used to estimate the kinds or probability increments required by the simulation.

uses information about what happens to 0.0 and 0.5 probabilities to compute increases in all other probability values in such a way as to reproduce a ceiling effect. While the percentage magnitude of the change we specified in lower-valued probabilities may appear rather large, it should be noted that we applied these modifications to message exposure probabilities. Each message exposure probability is the product of (1) an individual's probability of being exposed to a given medium and (2) the individual's probability of being exposed to a particular theme appearing in that medium in a particular message format given that he is exposed to the medium. Accordingly, by specifying a 2,000 per cent increase in message exposure probabilities close to zero we were actually requiring much smaller percentage increases in the media exposure and conditional message exposure probabilities of which they were composed.[1]

For the two better-educated groups we applied time-dependent increments to exposure probabilities for

---

[1] For example, suppose an individual's probability of being exposed to a given medium is 0.2 and his conditional exposure probability for a particular type of message in that medium is 0.05. An increase of 4,000 per cent in his 0.01 message exposure probability could be achieved by raising his media exposure probability 400 per cent, to 0.8, and his conditional exposure probability 500 per cent, to 0.25.

messages appearing in all five media types used in the simulation, while for the lower two educational groupings we only applied these probability increments to messages appearing in three of the five media types: Soviet domestic radio broadcasts, incoming foreign radio transmissions, and oral agitation meetings. Our purpose here was to have the simulation reflect the following hypothesis: Under the impact of the crisis, élite groups in the USSR, being regular users of all the media, increased their usage of these media, while the lesser educated strata only increased their usage of the types of media to which they were normally exposed. It is well known that in the early part of this decade newspapers, and especially magazines, were the medium of the Soviet educational élite, while domestic radio, and to a lesser extent oral agitation meetings, served as news vehicles for the broad masses of the Russian population. We assumed newspapers, because of the literacy problem, were not widely read by those with less than seven years of education, and that television, because of its expense and the correlation between occupation and education, was not readily accessible to most of the poorer-educated group during the Cuban crisis period.

The Simulated Pattern of Theme Exposures

At this point we are ready to describe and analyze the simulated Soviet population's exposure to themes in the Cuban crisis scenario. We will examine in turn the buildup of exposures for individual themes, the distribution of theme exposures across various population subgroups, the duplication of exposures between pairs of themes, and the relative importance of different types of media in diffusing themes.

We have tabulated and plotted in various ways the time series of exposures produced by the simulation and our analysis will be organized around the resulting tables and graphs. Before turning to the analysis, however, it is necessary to explain some of the features of these exhibits.

The first point that requires clarification is the meaning of ordinates and abscissas. On each graph that we will analyze, the horizontal axis indicates the days of the crisis and it covers either the period from October 23d to November 1st, 1962 or some portion of that interval. It is important to note, however, that each discrete point on the horizontal axis represents the entire day with which it is labeled, and that the spaces between these points are only for ease of representation. To be technical we should either have drawn histograms--i.e., spikes rising vertically to plotted exposure values from corresponding day points on the horizontal axis--or we should simply have plotted discrete exposure values in two-space. Instead, we chose to connect plotted exposure values with differently textured lines, each representing a different theme, dimension level, or media type, because this kind of display facilitates comparative analysis. Only the plotted exposure values above each day point are data; the lines connecting them are not. There is one other important feature of the horizontal axis on each graph: A given abscissa represents the period running from 4:00 a.m. Moscow Central Time on the day with which it is labeled to 3:59 a.m. Moscow Central Time on the following day.

All of the graphs and many of the tables that we will analyze are divided into two parts--one of which describes the population's cumulative exposure to themes (reach), and the other of which describes the exposed population's repeat exposure to themes (frequency). The labeling of the vertical axes for these two plots should serve to define both statistics unambiguously. There is a problem, however, with some of the cumulative exposure time series produced by the simulation. In the early 1960's the only medium to which virtually 100 per cent of the adult Soviet population had effective access was radio. Because of illiteracy probably not more than 70 per cent of the population could read newspapers or magazines. Because of incomplete diffusion networks only about one-half of the population had access to television, and perhaps one-third to foreign radio stations. Nevertheless, when we examined the simulated buildup of theme exposures via each type of medium we found in some cases that, for one or more of these media types, the cumulative percentage of the population exposed reached a value greater than the maximum possible percentage. A clue to the cause of this phenomenon was obtained from the observation that it only occurred <u>after</u> increases in normal exposure probabilities had been initiated.

The simulation uses two probability increments specified by the researcher to compute a formula for increasing probability values, and it applies this formula to specified types of individual exposure probabilities. From our discussion in the previous section the reader will recall that we specified these formula increases be applied to message exposure probabilities. Each such message exposure probability is the product of an individual's probability of exposure (1) to a given medium and (2) to a particular type of message appearing in that medium given that he is exposed to the medium. The problem is that, due to the way it was programmed, the simulation applied the formula increase to zero-valued message exposure probabilities, even when such a probability was zero because the individual's media exposure probability was zero--i.e., because he did not have access to the medium in which the message appeared. As a result of this programming error, our specification that crisis-triggered increases be applied to message exposure probabilities caused the simulation to ignore the exposure ceilings imposed by illiteracy and incomplete television and foreign radio diffusion networks in the USSR. This effect artificially inflated the rate of buildup of theme exposures via each type of medium. We therefore restrict our comparative analysis to the period before probability increases were initiated.[1]

There is also a problem with some of the time series of repeat exposures produced by the simulation. Because of a space limitation in the computer and the programming techniques required to take account of this,

---

[1]Fortunately, the simulation results indicate that the Soviet population's cumulative and repeat exposure to all but one of the Cuban crisis themes reached a significant level before the point at which we initiated crisis-triggered increases in message exposure probabilities. Accordingly, the role played by the mass media in diffusing news of the Cuban crisis to the Soviet population is largely observable in the "pre-triggering" portion of the simulation output.

the data needed to generate the total cumulative number of exposures among different types of persons in the simulation population is accumulated in the computer as the expected number of exposures for each simulated individual via each of the media types for up to six media types. The Cuban crisis simulation was run on a computer population of 1,200 persons and it included five media types. Thus, 6,000 numbers had to be kept cumulatively up to date to generate these exposure totals. In order to keep such a large number of statistics in the computer the simulation is programmed to pack them in thirty-six-bit computer words, four individuals' statistics to a word. Exposures are then measured in fiftieths allowing as many as 511 (2^9-1) fiftieths or 10.2 exposures for each individual via each media type. For themes which have a large number of messages, the number of exposures for some individuals via some media types can easily exceed 10.2 exposures. In each such case the computer stops accumulating exposures for the person via this media type after they have reached the 10.2 ceiling, and it continues to record only 10.2 exposures for him regardless of how much further the scenario proceeds, thus undercounting his exposures. As a result, for themes with large numbers of messages this calculation procedure can produce inaccurate counts of the total cumulative number of exposures within various population subgroups.

Many of the tables and graphs that we will analyze show the buildup of repeat exposures among various population subgroups. For any subgroup and a given time period we have defined this statistic as the average cumulative number of exposures per person among the portion of the subgroup exposed at least once through that time period. This is just the total cumulative number of exposures within the subgroup as a whole--i.e., the undercounted statistic--divided by the number of persons in the subgroup exposed at least once. Accordingly, many of the repeat exposure figures are underestimated in the tables and graphs which show the buildup of exposures within population subgroups. Fortunately, the simulation produces other totals of the cumulative number of exposures in addition to those for population subgroups (by individual media and by each of the media types), and these totals are accurate. From them we are able to determine the total amount of undercounting which has taken place for each of the themes at any stage of the scenario and, thus, to estimate the amount of undercounting within population subgroups.

The final feature of the tables and graphs requiring explanation is the way in which they represent time. President Kennedy's quarantine speech was delivered on

Monday evening, October 22d, 1962, at 7:00 p.m. Eastern Standard Time. In terms of Moscow Central Time the speech was therefore delivered on Tuesday morning, October 23d, at 2:00 a.m. We chose to begin the Cuban crisis simulation at 4:00 a.m. Moscow Central Time on Tuesday morning, October 23d. (Our content analyses showed that no crisis-related messages appeared in the Soviet media system during the two hours between Kennedy's speech and the beginning of this first simulation time period.) The tabulated and plotted exposure values represent statistics at the end of the indicated intervals or days. For example, Graph 6.1 shows that about sixty per cent of the Soviet population was exposed to some news about the U.S. naval quarantine at the end of the first simulation time period, i.e., by 4:00 a.m. Moscow Central Time on the morning of October 24th, or twenty-six hours after Kennedy's speech.

Having noted the major problems with the data, we are now ready to analyze the simulated time series of Soviet exposures to themes about the Cuban missile crisis.

The buildup of theme exposures

In Table 6.8 we present some of the important input and output statistics for themes in the Cuban crisis

TABLE 6.8.—The ~~cumulative~~ exposure of the simulated Soviet population to individual Cuban crisis themes after seventy-two hours of the scenario*

Theme	A Number of Messages	B Number of Exposures	C Average Number of Exposures Per Person (B/1,200)	D Average Number of Exposures Per Message (B/A)	E Number of Persons Exposed (At Least Once) (Pop. = 1,200)	F Number of Persons Exposed (At Least Once) Per Message (E/A)	G Average Number of Exposures Per Exposed Person (B/E)
1. The U.S. naval quarantine of Cuba	1,134	10,450	8.7	9.2	1,024	0.90	10.2
2. Reports of pro-Soviet or anti-U.S. reactions	849	8,270	6.9	9.7	1,040	1.22	8.0
3. Reports of pro-U.S. or anti-Soviet reactions	688	5,053	4.2	7.3	865	1.26	5.9
4. Soviet allegations of U.S. hostility towards Cuba	857	12,494	10.4	14.5	1,100	1.28	11.3
6. U.S. threats directed against the Soviets	384	4,044	3.4	10.5	829	2.16	4.9
7. Soviet threats directed against the U.S.	791	8,283	6.9	10.5	993	1.25	8.3

* The fifth theme did not begin until 13/24 of the way through time period 6 (October 28th). Exposure outcomes for this theme are not shown because ~~[illegible]~~ they were distorted by a programming error in the probability ~~[illegible]~~ routine (see [illegible] above for details).

scenario.[1] For each theme the table shows the number of messages in the simulated media, the number of exposures to these messages within the simulated population, the average number of exposures per person in the population as a whole, the average number of exposures per message, the number of persons exposed at least once to each theme, the number of persons exposed at least once per message, and the average number of exposures per person in the exposed population. These statistics are the values at the end of the first three time periods (or at the end of a simulated seventy-two hour interval). We choose a three-day "snapshot" of the population's theme exposure for purposes of comparison because, by the end of this period, substantial proportions of the population had been exposed to each theme and the distortions produced by crisis-triggered probability increases had not yet begun to occur.

The number of exposures for the population as a whole during the first seventy-two hours ranges from a low of 4,044 exposures to the theme of U.S. threats directed against the Soviets, for which there were 384

---

[1]Exposure outcomes for theme 5 (Soviet agreement to remove their missiles from Cuba), which did not begin until 13/24 of the way through time period 6 (October 28th), are not shown because they were distorted by a programming error in the probability triggering routine (see pp. - above for details).

messages, to a high of 12,494 exposures to the theme of Soviet allegations of U.S. hostility towards Cuba, for which 857 messages appeared. We note, however, that the theme of the U.S naval quarantine of Cuba received the second greatest exposure during this three-day period. Many of the messages conveying this theme were also likely to have carried, at least by implication, the theme of a U.S. threat directed against the Soviets. Therefore, it is probably reasonable to conclude that the effective extremes in theme exposure at the end of seventy-two hours were a low of 5,053 exposures to reports of pro-U.S. or anti-Soviet reactions, for which there were 688 messages, and a high of 12,944 exposures to Soviet charges of U.S. hostility towards Cuba.

The theme to which there apparently were the least exposures during the first seventy-two hours is related to the American version of events and the theme to which there were the most exposures during this period is related to the Soviet version. The exposure difference between themes 3 and 4 suggests, not surprisingly, that many more messages in the mass media carrying the pro-Soviet theme reached the Russian population than messages carrying the pro-American theme. We also note that the number of messages carrying the most diffused theme during the first seventy-two hours is less than one-third again as great as the number of messages carrying the theme that apparently was least diffused during this period, but the total and average number of exposures to the pro-Soviet theme are over two and one-half times the corresponding totals for the pro-American theme. The explanation for this disparity between coverage and exposure lies in the fact that the average number of exposures to a message conveying the most diffused theme (14.5) is almost twice as great as the average number of exposures to a message conveying the theme that presumably was least diffused (7.3). This average is just the expected number of exposures for the population divided by the number of messages. It depends on the sizes of the average audiences for the media in which the messages for a theme appear and the formatting of those messages. Accordingly, the simulation results indicate, quite reasonably, that the audiences for media in which most Soviet allegations of U.S. hostility towards Cuba appeared (Soviet media) were larger, on the average, than the audiences for media in which most pro-U.S. or anti-Soviet reactions appeared (radio broadcasts beamed to the USSR from abroad), and that the formatting of messages for the pro-Soviet theme was probably more salient, on the average, than the formatting of messages for the pro-American theme.

In spite of the differences between themes 3 and 4, however, the most interesting aspect of the simulation output summarized in Table .8 is the extent to which themes related to the American version of events, and other themes deemphasized in the Soviet media, apparently got through to the Russian population. We note that the average number of exposures to the least diffused theme, pro-American or anti-Soviet reactions, is 4.2 exposures for the population as a whole at the end of the three-day period. Over seventy per cent of the population (865 simulated persons) was exposed at least once to this theme, and among those exposed the average number of exposures was 5.9. These figures suggest that the bulk of the Soviet population was exposed to pro-American messages in the mass media during the first seventy-two hours of the Cuban crisis. Moreover, it seems likely that 5.9 exposures in seventy-two hours would have been enough to cause a significant change in the information level of the average exposed person. Accordingly, the simulation results also suggest that a substantial majority of the Soviet population had become aware of the American version of the quarantine story within seventy-two hours of President Kennedy's speech. As added support for this contention we note the cumulative and repeat exposure to reports about the quarantine (theme 1) and Soviet threats directed against the United States (theme 7). Exposures to the latter theme are significant because it formed an important part of the American argument justifying the establishment of the quarantine.

The simulation records cumulative exposure to a theme as the expected number of individuals exposed at least once.[1] The maximum value this number can grow to is, of course, the size of the simulation population. Generally speaking, as more and more messages go out in the mass media we expect two things to occur: (1) more and more people are reached at least once, but at a diminishing rate; (2) the average number of persons exposed at least once per message decreases. We observe this general effect in the fifth and sixth columns of Table 7.8.

---

[1] In non-crisis and slow-diffusion situations, perhaps a more interesting set of statistics would be the expected number of persons exposed zero times, once, twice, and so on--i.e., the frequency distribution of exposures to each theme. Although this distribution can easily be calculated, it could not be stored in the computer for which the simulation was programmed at the time of the Cuban crisis run. (Part of the simulation has since been reprogrammed for a larger machine and can now generate and store frequency distributions.) In any event, the cumulative exposure and estimated average number of exposures produced by the original version of the simulation proved to be adequate statistics for describing the mass media diffusion of Cuban crisis and Kennedy assassination themes through the Soviet population.

For themes 1, 2, 6 and 7 the average number of exposures per message lies between 9.2 and 10.5. This indicates that the distribution of messages over media and over formats within media varied only moderately across these four themes. But the variation in average number of exposures per message over all six themes ranges from 7.3 to 14.5, and this variation had an interesting effect on exposure outcomes. At the end of three time periods cumulative exposure to each of themes 2 and 4 exceeds that for theme 1 in spite of the fact that by this time a substantially greater number of messages had appeared for theme 1 than for either of these two themes. From performing the content analyses we retained the impression that accounts of the U.S. naval quarantine (theme 1) appeared in Soviet media in somewhat less salient or attention-getting formats, on the average, than either pro-Soviet and anti-American reactions (theme 2) or Soviet allegations of U.S hostility towards Cuba (theme 4). We speculate that themes 2 and 4 each have a higher average number of exposures per message than theme 1 primarily because of this difference in the distribution of messages over formats.

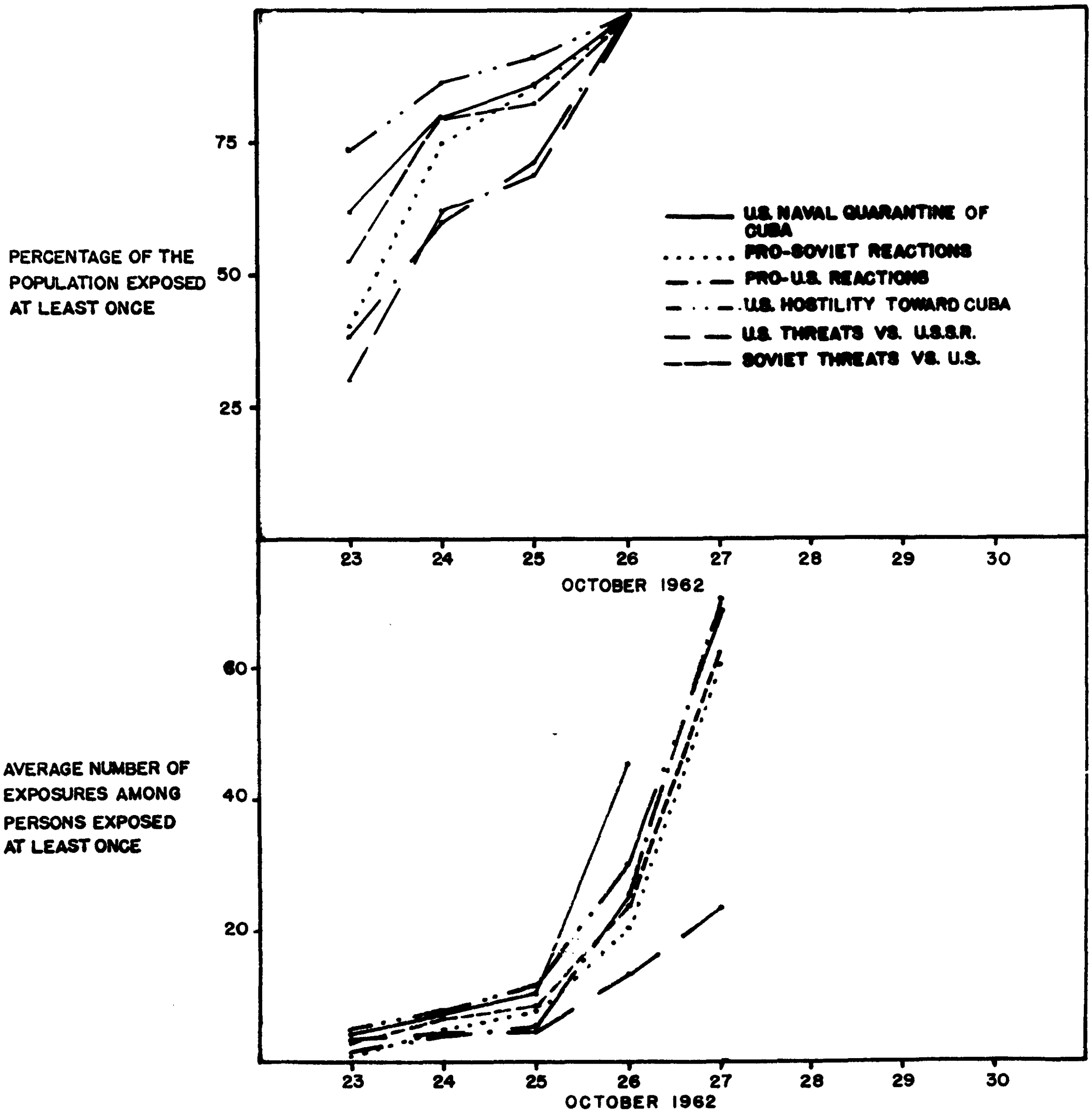
We have been analyzing a simulated record of the Soviet population's exposure to Cuban crisis themes at a given stage of the crisis--seventy-two hours after

President Kennedy's speech. To make the analysis dynamic we now consider Graph 6.1, which shows the simulated buildup of cumulative and repeat exposure over a period of several days.[1] As one might expect, differences in cumulative exposure to the various themes narrow over time. We also note that after 24- and 48-hour periods all but two of the themes have the same ordinal ranking with regard to cumulative exposure that they had after the seventy-two hour period analyzed above. The exceptions are pro-Soviet reactions (theme 2) and U.S. threats directed against the USSR (theme 6).

Soviet threats directed against the United States were more widely diffused than reports of pro-Russian or anti-American reactions during the first forty-eight hours of the crisis, the situation reversing itself thereafter. This effect is largely attributable to the way in which Soviet domestic media reported the crisis. Recall our earlier description of how, except for a strongly-worded official Government statement, Soviet authorities initially suppressed quarantine details and American charges about offensive Russian missiles in

---

[1]Exposure outcomes for theme 5, Soviet agreement to remove their missiles from Cuba, are not shown for the reasons discussed in footnote 1 on p. .



Graph 6.1 -- CUBAN CRISIS' REACH AND FREQUENCY BY THEME

Cuba. Later, they disclosed information on these matters along with accounts of world reaction in support of the Soviet position or in opposion to American actions. The more rapid initial buildup of cumulative exposure to Soviet threats than to pro-Soviet reactions also reflects the success of foreign radio in getting the American perception of events through to the Russian population. (We will analyze the role of foreign radio more fully in subsequent sections of this chapter.)

It appears that the end of the second crisis day was the only time the Russian population's cumulative exposure to American threats exceeded their cumulative exposure to pro-American reactions. This may have been caused by the fact that, because of their stop-press time, the 24th was the day on which Russian newspapers first reported the President's quarantine speech.

The Cuban crisis was a situation characterized by the rapid diffusion of news, not just in Western countries but in the Soviet Union as well. Accordingly, an important feature of the simulation results is the proportion of the sample population reached by each theme in the early stages of the crisis. The most interesting outcomes in this regard are the ones which indicate that more than a day after President Kennedy's quarantine speech as much as forty per cent of the Russian population had learned nothing about the quarantine from the mass media, almost half had not been exposed to any media reports of Soviet threats directed at the United States, and close to two-thirds had heard no mass media accounts of explicit American threats directed against the Soviet Union. In contrast, virtually everyone in the West must have been exposed to the three themes by this time because each theme occurred in the President's dramatic and widely-publicized speech.

Graph 6.1 also shows that twenty-six hours after Kennedy's speech almost three-quarters of the Russian population had been exposed at least once via the mass media to Soviet charges of American hostility towards Cuba. This result is not surprising, however, because our content analyses showed these allegations to be a frequently occurring theme, not only at the height of the missile crisis but also before and after the period covered by our scenario (see n. 2, pp.).

The simulation results show that by the end of the first day a majority of the Soviet population still had not been exposed to explicit mass media accounts either of pro-Russian or pro-American reactions from around the world. As we speculated above, low exposure to pro-Russian reactions on the 23d is probably due to the fact that a substantial amount of material in support of the Soviet case or in opposition to American actions did not begin to appear in Russian media until the 24th, the day on which the Government first released news of the American charges and details of the quarantine. Low exposure to pro-American world reactions on the 23d can be attributed to the fact that they had not fully materialized twenty-six hours after Kennedy's speech. As a result, the effectiveness of foreign radio in bringing these reactions to the Soviet population is only partially reflected in the cumulative exposure to this theme at the end of the first time period.

Finally, we observe that, while the differences in cumulative exposure to the themes tend to narrow over time, the differences in repeat exposure apparently broaden, at least during the first seventy-two hours. This is especially true for the two most rapidly-diffused themes compared to the two themes that had the slowest buildup of cumulative exposure, and it reflects the fact that after October 23d most exposures to Soviet allegations of U.S. hostility towards Cuba and to reports about the quarantine were mainly among persons who had already been exposed to each of these themes, while on October 24th and 25th exposures to reports of pro-American world reaction and to explicit accounts of U.S. threats directed at the Soviet Union were still occurring mainly among persons who had not yet been exposed to either of these themes.

<u>The distribution of theme exposures over population subgroups</u>

For the simulation population as a whole, and for each level of the "age" and "education" dimensions, Table 6.9 shows the cumulative percentage of persons exposed to individual Cuban crisis themes at least once and the average cumulative number of exposures per person among those exposed at least once, after three time periods of the scenario. The number of exposures per person is slightly undercounted for each theme, for reasons discussed above (pp.   -   ). By comparing the expected average number of exposures per exposed person in the simulation population as a whole (Table 6.9) with the corresponding statistic summed over the various media types (Table 6.8), we can determine the total amount of undercounting for each theme. The comparison shows that for theme 1, by the end of the third time period, 14.1 per cent of the exposures were uncounted. For theme 2 the figure is 10.4 per cent, for theme 3 9.9 per cent, for theme 4 23.2 per cent, for theme 6 7.1 per cent, and for theme 7 12.3 per cent. We note that the undercounting is not random; its magnitude increases with the expected average number of exposures per person. As a result, those population

TABLE 8.9.-- Cumulative and repeat exposure of selected subgroups of the simulated Soviet population to individual Cuban crisis themes after seventy-two hours of the scenario[a]

Theme	Total Population	Age 16-29	Age 30-49	Age 50+	Education <4	Education ≥4,<7	Education ≥7≤10	Education >10
1. The U.S naval quarantine of Cuba	85.4[b] (8.8)[c]	94.6 (10.2)	84.7 (8.5)	74.1 (6.6)	70.1 (5.4)	90.3 (9.0)	94.4 (10.2)	99.5 (14.6)
2. Reports of pro-Soviet or anti-U.S. reactions	86.7 (7.1)	91.9 (8.2)	88.6 (7.0)	77.1 (5.6)	74.3 (4.4)	91.5 (7.2)	93.2 (8.4)	99.3 (12.8)
3. Reports of pro-U.S. or anti-Soviet reactions	72.1 (5.2)	82.9 (6.2)	72.5 (4.8)	56.8 (4.2)	52.1 (3.5)	78.8 (5.3)	82.5 (5.6)	98.4 (10.2)
6. U.S. threats directed against the Soviets	69.1 (4.5)	82.6 (5.2)	65.3 (4.1)	56.0 (3.6)	50.2 (3.2)	76.5 (4.6)	77.9 (4.6)	96.9 (8.3)
7. Soviet threats directed against the U.S.	82.7 (7.4)	92.4 (8.4)	81.1 (7.0)	71.9 (5.7)	68.4 (5.1)	87.2 (7.9)	90.9 (7.8)	99.0 (11.7)

[a] Exposure outcomes for theme 5 are not shown for reasons discussed in the footnote to Table 7.8. For each theme, the data in Table 7.9 underestimate repeat exposure (average number of exposures per person among those exposed at least once), especially in the subgroups with greatest exposure ~~because of the large number of messages of the storage limits in the computer~~ (see pp. - above for details).

[b] Cumulative percentage exposed at least once.

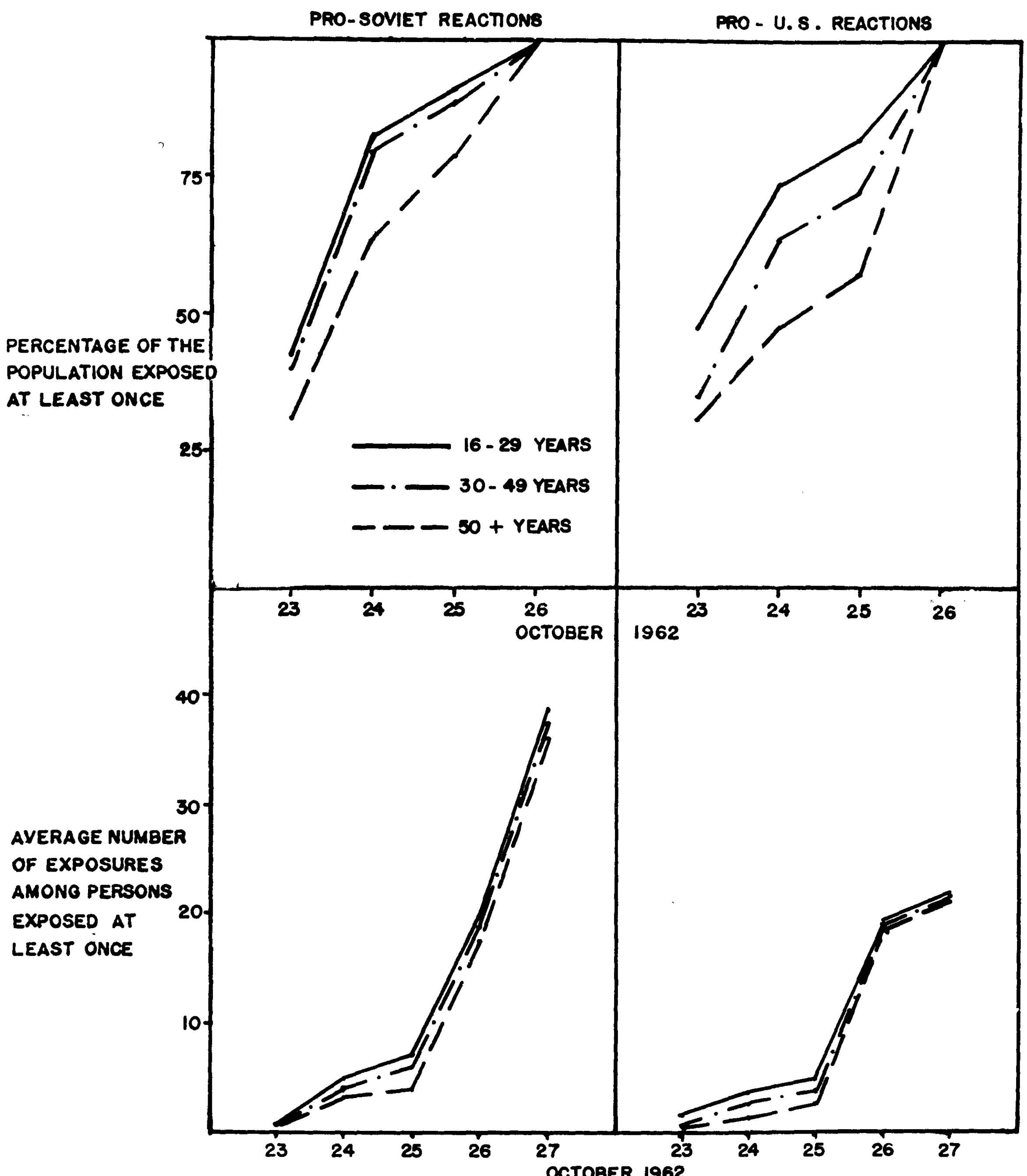
[c] Average number of exposures per person among those exposed at least once.

subgroups having the greatest repeat exposure are probably also the ones for which this statistic is most under-estimated.

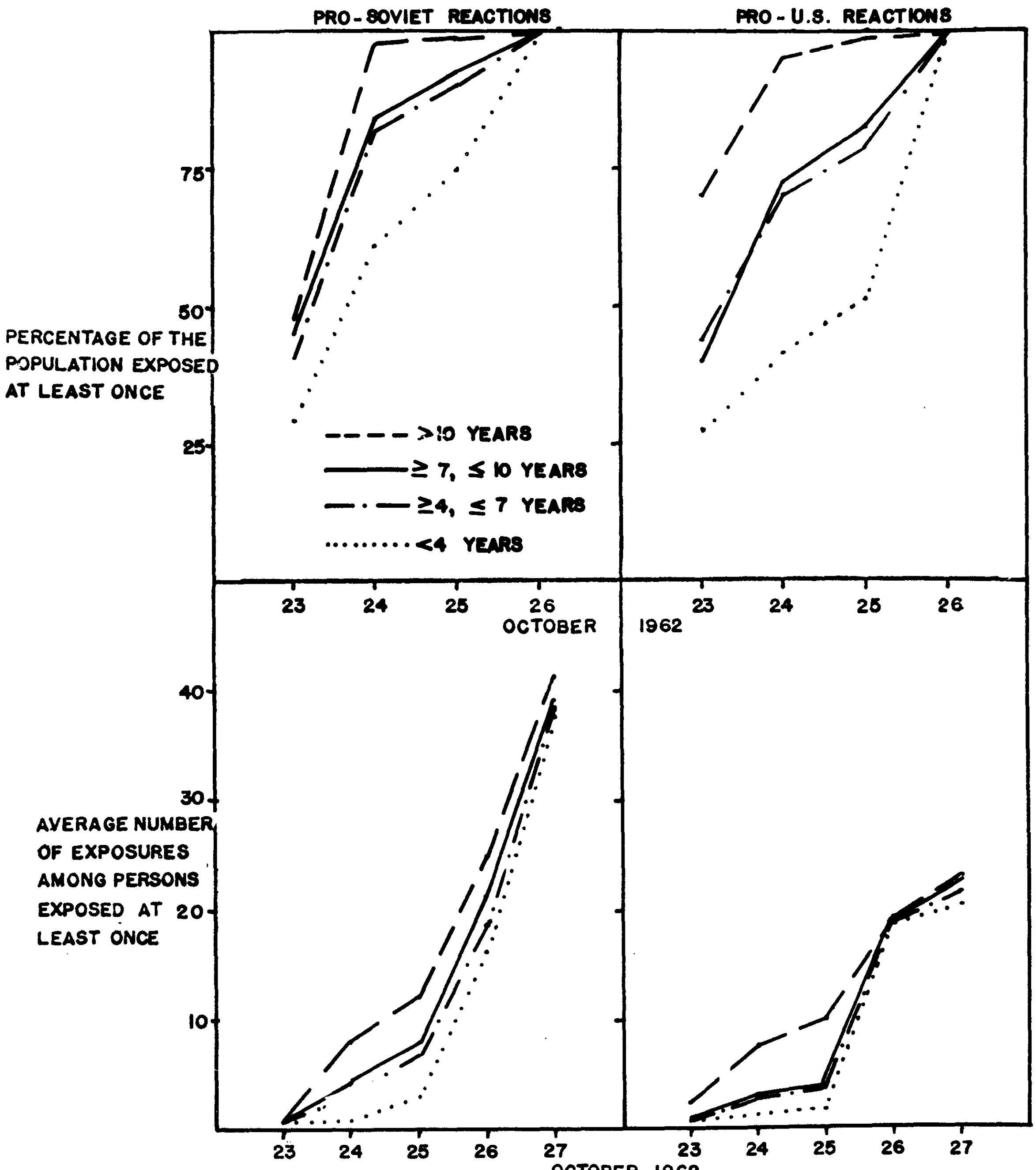
The cumulative and repeat exposure figures in Table 6.9 vary significantly from theme to theme and, for a given theme, within socio-demographic categories. In every case, however, we find (not surprisingly) young people are more exposed than older people and educated people more exposed than the less well-educated. (The simulation results also showed urbanites slightly more exposed than rural persons; they showed no significant exposure differences by "sex" and "political involvement," however.) Persons with more than ten years of education have 14.0 to 46.7 per cent more cumulative exposure and 1.7 to 2.9 times the repeat exposure of persons with less than four years of education. The corresponding ranges on the "age" dimension are 8.5 to 26.6 per cent and 1.3 to 1.5 times. These simulation results suggest that (1) the "education" dimension accounted for more of the variation in exposure to Cuban crisis themes over subgroups of the Soviet population than either the "sex," "age," "political involvement," or "residence" dimension, and (2) the "age" dimension explained more of the variation not accounted for by "education" than either the "sex," "political involvement," or "residence" dimension.

The most interesting and important feature of Table 6.9 is the pattern of exposure differences which it reveals. Three days into the crisis almost half of all Russians with less than four years of education had not been exposed to any media reports of pro-American or anti-Soviet world reaction, and similar percentages of this group and of all Russians fifty or more years old had heard no explicit mass media accounts of American threats directed against the Soviet Union. At the same time, however, at least two-thirds and, in most cases, over three-fourths of the Russians on every other dimension level had been exposed at least once to each of these two themes and, of course, to each of the other themes as well. This pattern, reflecting as it does the combined flow of messages from Soviet domestic media and foreign radio, suggests that after seventy-two hours of the Cuban crisis, Soviet techniques of selective propagation had probably been effectively counteracted, among all but the uneducated and aging segments of the Russian population, by radio broadcasts beamed to the USSR from abroad.

Graphs .2 and .3 show, for two of the Cuban crisis themes, the buildup of cumulative and repeat exposure over a period of several days on each level of the "age" and "education" dimensions in the simulated



Graph 6.2-- CUBAN CRISIS: REACH AND FREQUENCY BY AGE



Graph 6.3-- CUBAN CRISIS: REACH AND FREQUENCY BY EDUCATION

Soviet population.[1] We note that the pattern observed at the end of seventy-two hours (Table 6.9) also prevails at the end of the first and second crisis days: the better-educated and the young more rapidly and heavily exposed than those with less education and older people. At the end of each of the first two crisis days the simulation results also showed urbanites slightly more exposed than rural dwellers, small and inconsistent exposure differences by "sex" and "political involvement." With regard to the diffusion of the pro-American theme among various population subgroups, we observe that over seventy per cent of all Russians with more than ten years of education had been exposed at least once by the end of the first full time period (twenty-six hours after Kennedy's speech), while only about one in every four Russians with less than four years of education had been similarly exposed at this point. We also note that the percentage of persons between the ages of sixteen and twenty-nine exposed

---

[1]The repeat exposure figures in the lower portion of these graphs are slightly underestimated, for reasons discussed above (pp. -). We also noted above that the undercounting is greatest for those themes which have the highest average number of exposures per exposed person (pp. -). Therefore, in the bottom portions of Graphs 6.2 and 6.3, the repeat exposure figures should be somewhat higher for each subgroup, the percentage increase rising with a subgroup's level of exposure and with succeeding time periods.

to the pro-American theme at least once is almost twice as great as the corresponding percentage among persons fifty or more years of age. Even among young people, however, cumulative exposure had not quite reached fifty per cent by the end of the first crisis day.

It is particularly interesting to note in Graphs 6.2 and 6.3, that the variation in exposure over both the "education" and "age" dimensions is consistently greater for the pro-American than the pro-Russian theme. This result undoubtedly reflects the differential impact of foreign radio. The extent of that medium's effectiveness is suggested by the simulation outcome showing more educated Russians and more young Russians exposed to the pro-American theme than to the pro-Russian theme by the end of the first crisis day.

Finally, several additional features of Graphs 6.3 are worthy of note. For both the pro-American and the pro-Russian theme the pattern of cumulative exposure over the "education" dimension has a clearly definable tripartite structure. It builds most rapidly and to the greatest level among persons with more than ten years of education, least rapidly and to the lowest level among persons with less than four years of education. Within the two middle education groups--persons with between four and ten years of education--the rate of buildup and the magnitude of cumulative exposure have intermediate and roughly equal values. A similar structure is also evident in the population's repeat exposure to the theme of pro-Russian reactions. For the theme of pro-American reactions, however, repeat exposure is structured dichotomously along the "education" dimension. It builds most rapidly and to the greatest level with the best-educated group. At the same time, its rate and magnitude are significantly lower and roughly the same within the other three education groups--those with ten or less years of education. These findings probably reflect a well-known fact about the diffusion of news in the Soviet media system: During a complex international confrontation like the Cuban missile crisis, the best-educated stratum of Soviet society is more rapidly and heavily exposed to mass media accounts of the Western version of events than the rest of the population. In Chapter VIII we will observe a distinctly different pattern in the simulated Soviet population's exposure to themes about the assassination of President Kennedy--a dramatic but intrinsically less complex international crisis than the Cuban confrontation.

For individual themes Table 6.10 shows the most exposed and least exposed two-dimension subgroups in the simulated Soviet population, and for each of these subgroups, the cumulative percentage of persons exposed at least once

TABLE 6.10.--Most and least exposed subgroups of the simulated Soviet population, for individual, Cuban crisis themes, after seventy-two hours of the scenario[a]

Theme	Most Exposed		Least Exposed	
	Group	Exposure	Group	Exposure
1. The U.S. naval quarantine of Cuba	Age 16-29, $>$10 yrs. ed.	100.0[b] (17.9)[c]	Age 50+ $<$4 yrs. ed.	64.3 (3.7)
2. Reports of pro-Soviet or anti-U.S. reactions	Age 16-29 $>$10 yrs. ed.	99.9 (16.4)	Age 50+ $<$4 yrs.ed.	69.6 (2.9)
3. Reports of pro-U.S. or anti-Soviet reactions	Age 16-29 $>$10 yrs. ed.	100.0 (12.9)	Age 50+ $<$4 yrs.ed.	44.6 (2.5)
4. Soviet allegations of U.S. hostility towards Cuba	Age 16-29 $>$10 yrs. ed.	98.6 (13.4)	Age 50+ $<$4 yrs.ed.	81.0 (5.2)
6. U.S. threats directed against the Soviets	Age 16-29 $>$10 yrs. ed.	99.8 (10.2)	Age 50+ $<$4 yrs.ed.	44.3 (1.9)
7. Soviet threats directed against the U.S.	Age 16-29 $>$10 yrs. ed.	100.0 (14.0)	Age 50+ $<$ 4 yrs.ed.	63.2 (3.5)

[a] Exposure outcomes for theme 5 are not shown for reasons discussed in the footnote to Table 6.8. Excluded from the comparison in Table 7.10 are subgroups of the simulation population containing less than 15 persons. There were six such groups: Female Party members (13); Party members, age 16-29(11); Party members with less than 4 years of education (0); Party members with more than 10 years of education (9); rural dwellers with more than 10 years of education (7); persons 50 or more years of age with more than 10 years of education (7). For each theme the data underestimate repeat exposure (average number of exposures per person among those exposed at least once), especially in the subgroups with greatest exposure (see pp. - above for details).

[b] Cumulative percentage exposed at least once.

[c] Average number of exposures per person among those exposed at least once.

and the average cumulative number of exposures among persons exposed at least once, after three time periods of the scenario. There are several interesting features of these data.

First, we observe (as we did for population subgroups defined by one dimension at a time) that the levels of cumulative and repeat exposure vary significantly from theme to theme and, for a given theme, from the most to the least exposed subgroups. It is important to note, however, that in each case the most exposed subgroup is persons between the ages of sixteen and twenty-nine with more than ten years of education, and the least exposed subgroup is persons fifty years of age or older with less than four years of education. The fact that the most and least exposed subgroups are the same for each theme suggests that the distributions of exposures over population subgroups were similar for each theme in the following sense: The rank-ordering of subgroups by number of exposures probably was the same for each theme.[1]

---

[1]This assumption is supported by the simulation outcome showing that, for each theme, nonParty members with more than ten years of education and females with more than ten years of education were either the second- or third-most exposed subgroups, and that rural residents with less than four years of education and rural residents fifty or more years of age were either the second- or third-least exposed subgroups.

For any theme the distribution of exposure over population subgroups depends on four factors: the distribution of the media's audiences over population subgroups; the distribution of messages over media; the distribution of messages over formats within media; the ratio of average exposure probabilities for the levels on each dimension. The design of the simulation computer programs required that we establish one set of ratios of average exposure probabilities for all themes. We know, however, that the formatting of messages did vary somewhat from theme to theme and that the distribution of messages over media varied significantly between Soviet media, on the one hand, and foreign radio, on the other. The simulation results therefore suggest that, for Soviet domestic media as a whole and for foreign radio media as a whole, the distribution of media audiences over subgroups of the Soviet population were similar, in the following sense: The rank-ordering of population subgroups by average percentage of the subgroups in the audience of an individual medium probably was similar. Checking the simulation output we did, in fact, find this to be the case for all but the "sex" dimension. With Soviet domestic media males had an average coverage of 6.5 per cent, females 8.8 per cent. In the case of foreign radio, males had an average coverage of 9.6 per cent, females 6.0 per cent.

The greatest range of exposure between the most and least exposed two-dimension subgroups is for theme 6, explicit accounts of American threats directed against the Soviets, followed closely by theme 3, reports of pro-American or anti-Russian world reaction.[1] We have already discussed the fact that, of the seven themes, these two received the least coverage in Soviet domestic media. The wide variation in exposure to each of them reflects, again, the differential impact of foreign radio. The narrowest range of exposure is for the fourth theme, Soviet allegations of U.S. hostility towards Cuba. Of the seven themes in the Cuban crisis scenario, theme 4 received the heaviest coverage in Soviet domestic media. The simulation results therefore suggest that Soviet efforts to emphasize selected Cuban crisis themes in their media reportage were far more effective among older, poorly-educated persons than among the younger, better-educated segments of the population. At the end of seventy-two hours,

---

[1]The fact that the range of exposure between the most- and the least-exposed two-dimension subgroups varies somewhat from theme to theme suggests that, while the audience distributions for Soviet media and foreign radio were similar in the ordinal sense described above, their means of variances differed. Specifically, the variations in the range of exposure reflects the fact that the young and the educated were even more overrepresented in the foreign radio audience than in the audience of Soviet domestic media.

cumulative exposure to theme 3 (which the Soviets played down) and theme 4 (which they propagated) was roughly the same among persons with more than ten years of education who were between the ages of sixteen and twenty-nine. Repeat exposure to the two themes was also about the same in this highly exposed subgroup. Among persons fifty or more years old with less than four years of education, however, cumulative exposure to theme 4 was almost twice as great as cumulative exposure to theme 3, and repeat exposure more than twice as great.

The simulation results also suggest that tactics of delay and deemphasis in the Soviet media's thematic treatment of the Cuban missile crisis were far more effective among older, poorly-educated persons than among the younger, better-educated segments of the population. The percentage of persons with more than ten years of education between the ages of sixteen and twenty-nine who were exposed at least once to the pro-American theme after seventy-two hours appears to have been over twice as great as the percentage of persons fifty or more years old with less than four years of education who were exposed at least once. Moreover, virtually all of the young, well-educated group were exposed to the pro-American theme at least once by this stage of the crisis and their average exposure frequency was more than five times as great as that of exposed persons in the aging, uneducated group.

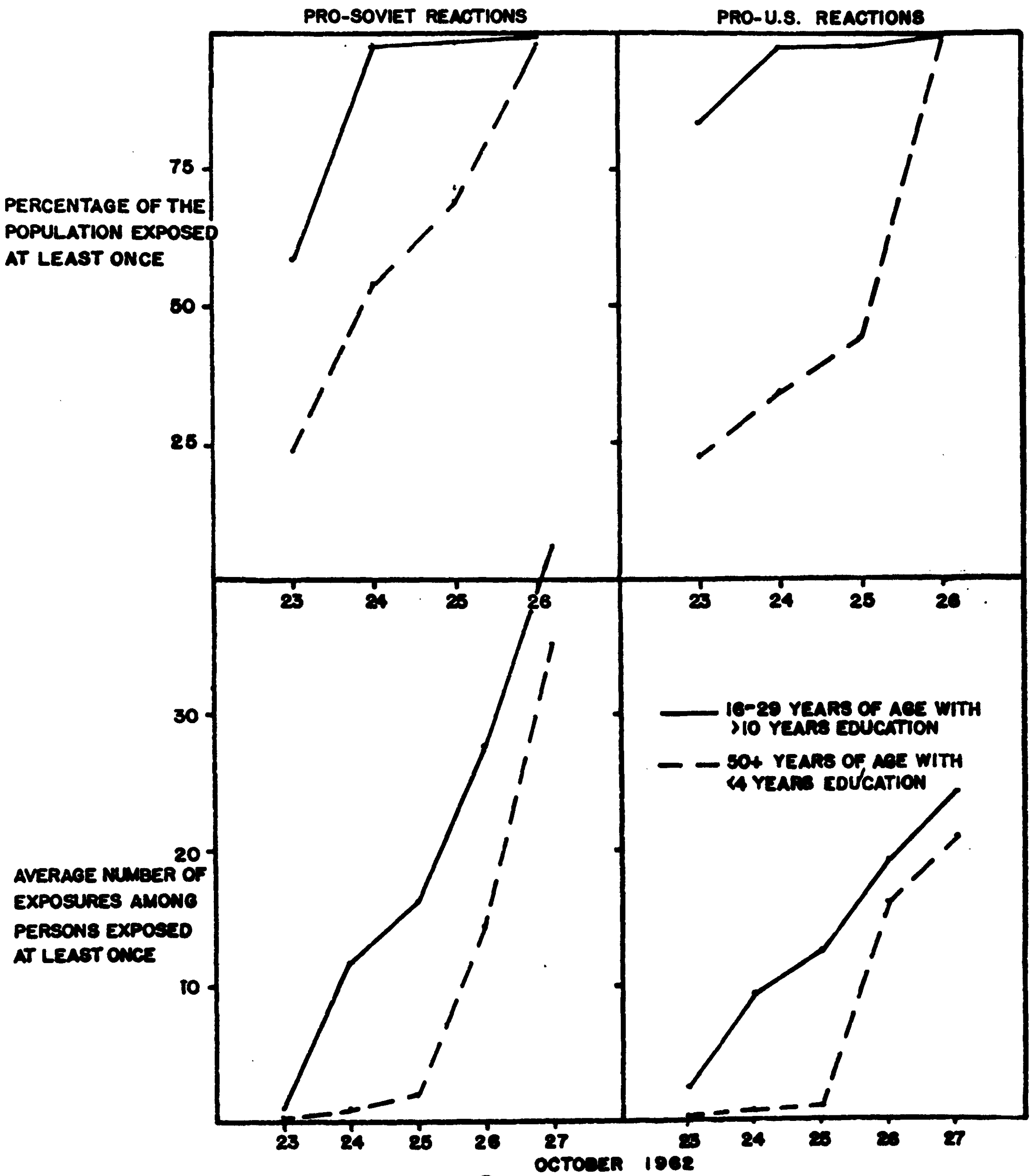
Another interesting feature of Table 6.10 is the range in exposure between the most and least exposed subgroups. The most exposed group has 18 to 55 per cent more cumulative exposure than, and 2.6 to 5.7 times the repeat exposure of, the least exposed group. We note that these differences are even greater than the range of exposure found on either the "age" or "education" dimention alone. Thus, the simulation results not only suggest that Russians with advanced schooling were significantly more likely to have been exposed to Cuban crisis media material than their less educated countrymen, and that young Russians were more likely to have been exposed than middle-aged or older Russians; they also indicate that the influence of "age" and education" were additive in this regard.[1] Put another way, more of the variation in exposure is explained by the dimensions "age" and "education" together than by either dimension alone.

Finally, we note that within seventy-two hours of President Kennedy's speech virtually every Russian between the ages of sixteen and twenty-nine with more than ten years of education had been exposed to each of the six Cuban crisis themes at least 10 times. Also, a minimum of nearly half the Russians in the least exposed subgroup (persons fifty or more years old with less than four years of education) had been exposed to each theme at least twice. We therefore conclude that by the end of the third day of the Cuban crisis the majority of most (two-dimensionally defined) subgroups of the Soviet population had heard mass media accounts of each theme.

---

[1]The kinds of predisposing attributes studied in the social sciences are generally additive in their effects, whether the behavior under study is media consumption, the adoption of innovations, voting, etc. For an example in the area of voting behavior the reader is referred to Pool, Abelson, and Popkin, Candidates, Issues, & Strategies, pp. - .

Graph 6.4 shows, for two of the Cuban crisis themes, the buildup of cumulative and repeat exposure over a period of several days within the most and least exposed two-dimension subgroups of the simulated Soviet population. We note that the pattern observed at the end of seventy-two hours (Table 6.10) prevails at the end of the first and second crisis days as well: young, educated Russians more rapidly and heavily exposed than their older, less educated countrymen. We also observe that over eighty per cent of all Russians in the most exposed subgroup had been exposed to the pro-American theme at least once by the end of the first crisis day while less than a quarter of the least exposed subgroup had been reached by the theme at this point. Moreover, young, well-educated Russians were more highly exposed to pro-American than to pro-Soviet reactions at the end of the first time period. This suggests a substantial segment of the Soviet élite heard the Western version of the quarantine story even before they heard their own country's version of events, an outcome which undoubtedly reflects the combined impact of foreign radio and initially-delayed reporting of Cuban crisis material in Soviet domestic media. The latter factor is also responsible for the simulation outcome showing that, as long as twenty-six hours after Kennedy's speech, almost forty per cent of the most exposed subgroup and over three-quarters of the least



Graph 6.4-- CUBAN CRISIS: REACH AND FREQUENCY AMONG SELECTED AUDIENCE TYPES

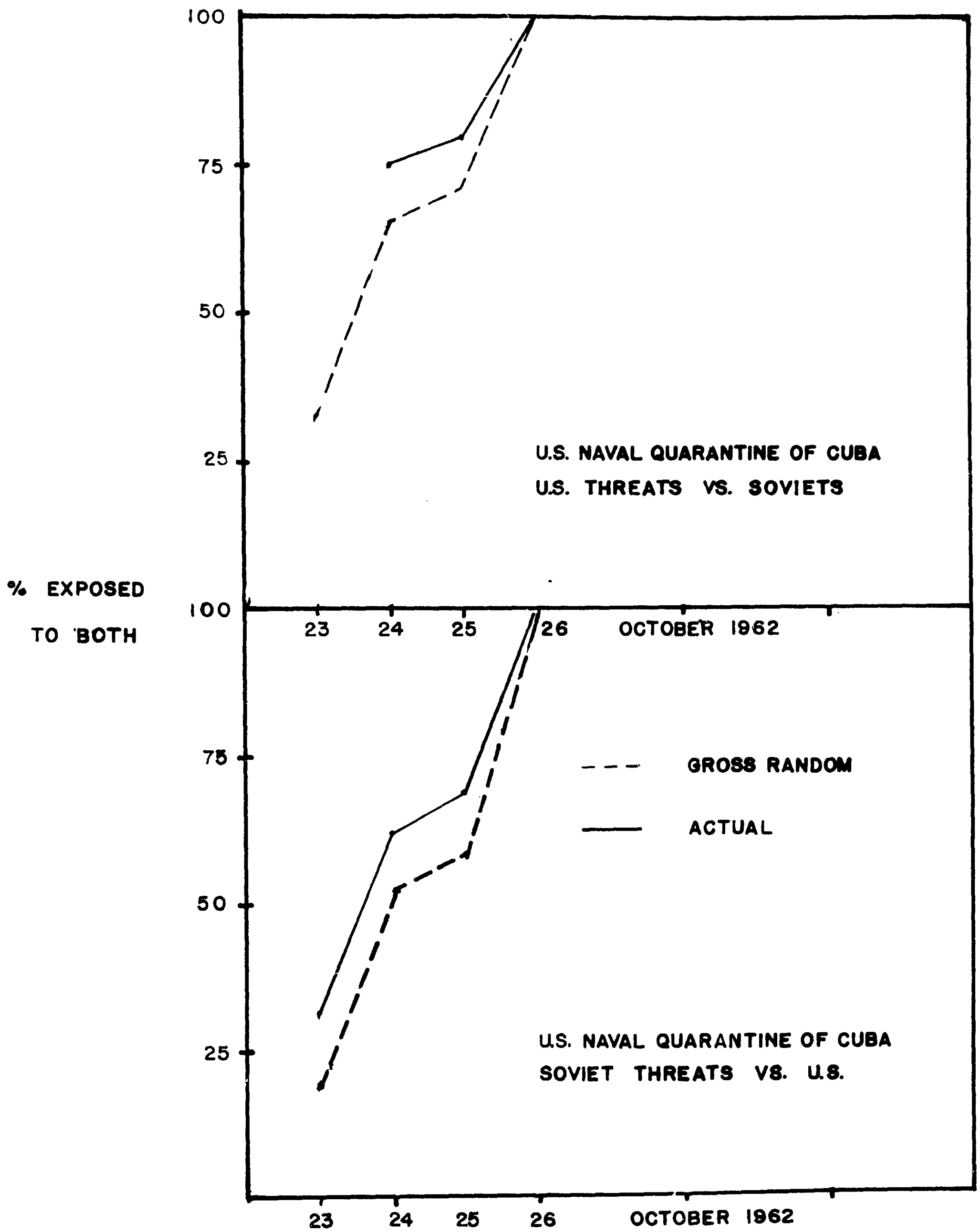
exposed group had not heard any pro-Russian mass media accounts of the crisis.

The duplication of exposure between themes

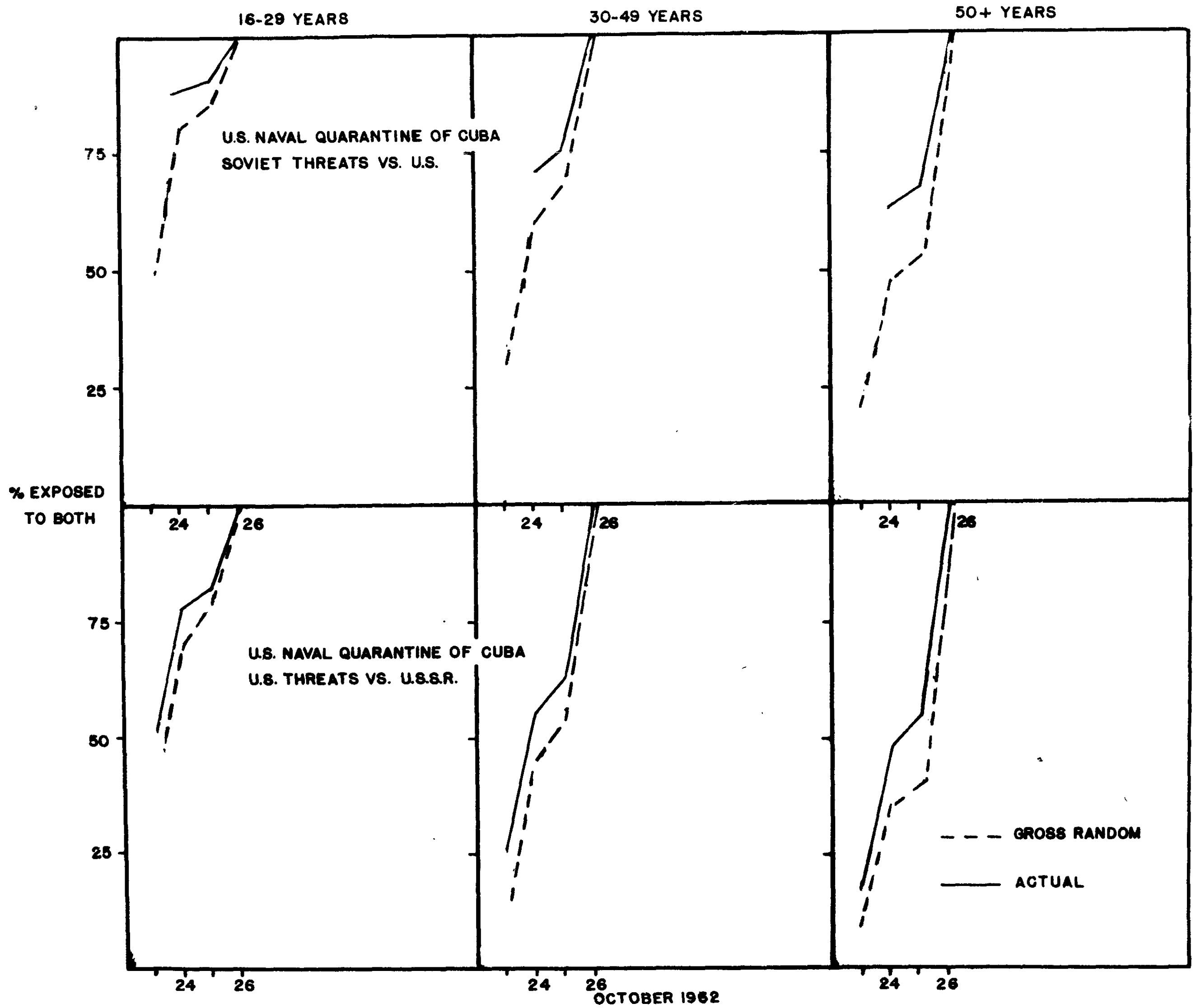
It would be interesting to simulate the audience shared by any possible combination of themes in the scenario, and to observe how this audience breaks down by each of the population dimensions at any stage of the scenario. Unfortunately, the machine for which the simulation was programmed at the time of the Cuban crisis and Kennedy assassination runs lacked the storage capacity required to maintain all of these statistics. As a result, the simulation programs were designed to compute only a subset of the possible duplication statistics, viz., the audience duplications between each of the possible pairs among the first three themes and between each of the first three themes and any other theme in the scenario.

We therefore had to decide in advance which audience duplications were potentially most interesting, and establish the themes involved in the largest number of these duplications as the first themes (up to a maximum of three) in the scenario. Each such theme also had to be identified as a "trigger theme" so that the simulation would maintain a record of individual exposure histories for it. These exposure histories then formed the basis for audience duplication estimates. We also had the option of specifying changes in individual probabilities of exposure to other themes in the scenario as a function of individual exposure histories for the various trigger themes.

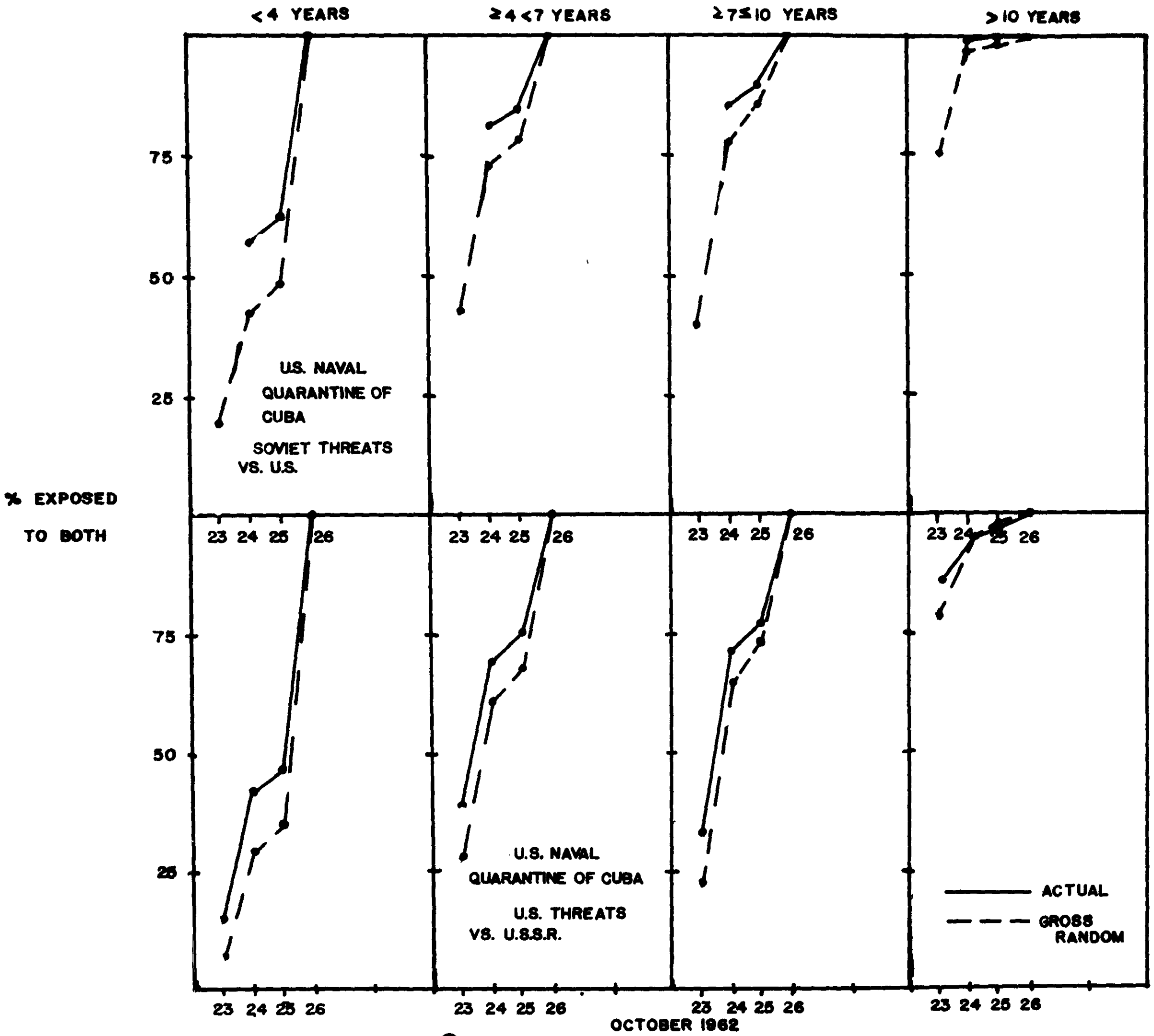
In the Cuban crisis scenario we established one trigger theme (although we did not use it to specify changes in individual probabilities as a function of exposure), and that was theme 1, "the U.S. naval quarantine of Cuba." Graphs 6.5 through 6.7 show, for the population as a whole and for the "age" and "education" dimensions, the buildup over several days of the random and actual audience duplications between the trigger theme and each of themes 6 and 7. Each "random" duplication has been computed by the simulation on the basis of chance expectation, i.e., as the product of the percentage of the population grouping exposed at least once to one theme and the percentage exposed at least once to the other theme through the end of the indicated time period. Each "actual" duplication has been computed by the simulation on an expected value basis, i.e., as the expected value of the percentage of the population grouping exposed at least once to each of the two themes in question through the end of the indicated



Graph 6.5 --CUBAN CRISIS: GROSS RANDOM AND ACTUAL DUPLICATED REACH FOR SELECTED PAIRS OF THEMES



Graph 6.6 --CUBAN CRISIS: GROSS RANDOM, AND ACTUAL DUPLICATED REACH, BY AGE, FOR SELECTED PAIRS OF THEMES



Graph 6.7 --CUBAN CRISIS: GROSS RANDOM AND ACTUAL DUPLICATED REACH, BY EDUCATION, FOR SELECTED PAIRS OF THEMES

time period.[1]

The outcomes pictured in Graphs 6.5 through 6.7 show that, within the simulated Soviet population as a whole, and among the Russian people on each level of the "age" and "education" dimensions, the duplicated audiences between themes 1 and 6 and themes 1 and 7 were substantially greater than might have been expected on a random basis at each stage of the scenario. (The simulation output also showed this same result among people on each level of the "sex," "political involvement" and "residence" dimensions.) These results suggest that the types of persons likely to have been exposed to the key Cuban crisis theme--reports on the U.S. naval quarantine--were the same types of persons likely to have been exposed to other important themes, such as threats passing between the U.S. and USSR, a result which is not surprising. Earlier, we reviewed simulation findings which suggested that the audiences of Soviet media and foreign radio were similarly distributed over

---

[1]In noncrisis and slow-diffusion situations, where repeat exposures are required to bring about changes in information levels and attitudes, a more interesting set of statistics would be the expected number of persons exposed to each theme zero times, once, twice, and so on--i.e., the joint frequency distribution for each pair of themes. Although this distribution can easily be calculated, it could not be stored in the computer for which the simulation was programmed at the time of the Cuban crisis run.

various population subgroups. In addition, it seems reasonable to assume there was a fair degree of overlap among the audiences for various media types in the simulation. These structural features of the Soviet media system lead us to expect greater than chance audience duplications between all possible pairs of themes in the Cuban crisis scenario.[1]

Along the dimensions of "age" and "education" we observe a significant variation in the degree to which audience duplications depart from randomness (Graphs 6.6 and 6.7). It appears that duplicated exposure to pairs of Cuban crisis themes was most nonrandom among members of the Soviet population with less than four years of education and among persons fifty or more years of age. This finding is perhaps explained by the observation that the average overlap of the media's audiences is likely to be greater in less media-immersed population groups than in more media-immersed groups.

---

[1] In checking the simulation output we found this to be the case not only for themes 1 and 6 and 1 and 7, but for theme 1 and each of the other themes as well.

The role of the media in diffusing themes

Table 6.11 shows the distribution of exposures over media types for themes in the Cuban crisis scenario. This distribution varies greatly from theme to theme. The combination of Soviet newspapers and radio transmissions beamed to the USSR from abroad was responsible for most of the simulated Soviet population's exposure to theme 1. For theme 4, on the other hand, most of the exposures were via Soviet domestic radio. Incoming foreign radio transmissions accounted for the largest flow of messages for themes 3, 6, and 7, while Soviet newspapers combined were the single most important channel for theme 2. An interesting feature of these findings is the importance of foreign radio, which accounted for from 43 to 88 per cent of the simulated Soviet population's exposures to four of the themes. We also note that the two themes propagated most heavily by Soviet media were channeled somewhat differently. The population's exposure to reports of pro-Russian or anti-American world reaction appears to have been split about equally between Soviet print and electronic media, but the latter were by far the most important channel for disseminating Russian charges of American hostility towards Cuba. Lastly, we observe that themes conveyed to the Russian population predominantly

TABLE 6.11.-- Percentage of total exposures to individual Cuban crisis themes via each media type in the seventy-two hours of the scenario *

Theme	Media Type: Soviet Newspapers	Soviet Radio	Soviet Television	Foreign Radio	Total
1. The U.S. naval quarantine of Cuba	34.1%	25.0%	10.1%	30.8%	100.0%
2. Reports of pro-Soviet or anti-U.S. reactions	39.1	23.1	15.8	22.0	100.0
3. Reports of pro-U.S. or anti-Soviet reactions	22.7	16.9	8.2	52.2	100.0
4. Soviet allegations of U.S. hostility towards Cuba	22.4	51.0	23.1	3.5	100.0
6. U.S. threats directed against the Soviets	11.7	27.0	5.4	55.9	100.0
7. Soviet threats directed against the U.S.	9.7	32.5	15.1	42.7	100.0

*Exposure outcomes for theme 5 are not shown for reasons discussed in the footnote to Table 6.8. Also not shown are the exposure outcomes for media type 5, the Soviet oral agitation network, because we did not specify any messages in this media type during the first three time periods.

by foreign radio tended to flow more heavily to the domestic audience via Soviet electronic media than through the Russian press. Here we may be observing the impact of foreign radio in forcing Soviet electronic media to compete for the domestic audience.

Figures in Table 6.12 represent the proportions of the total exposures to individual Cuban crisis themes accounted for by the six most important media, after seventy-two hours of the scenario. As with media types, the distribution of exposures over individual media varies from theme to theme. All-Union evening radio was clearly the single most important channel for theme 4, while for theme 1 it was followed closely by nightime Voice of America broadcasts. Although Table 6.11 showed Soviet newspapers as the most important media type for theme 1, we note in Table 6.12 that only one individual Soviet newspaper, Izvestia, appears among the most important vehicles for the quarantine theme, and it ranks fifth in importance. This is a consequence of our having established many more print than radio, television, or foreign radio media in the simulation with the result that single-issue print audiences are smaller, on the average, than their electronic counterparts.

Individual newspapers (Pravda and Komsomolskaya pravda) are also among the important vehicles for theme 2.

TABLE 6.12.-- Individual media accounting for the greatest number of exposures to individual Cuban crisis themes after seventy-two hours of the scenario*

Theme	Media With the Heaviest Flow and Percentage of Total Exposures to the Theme Via Each Medium (In Descending Order of Importance) 1	2	3	4	5	6
1. The U.S. naval quarantine of Cuba	All-Union Radio (6:00-9:29 p.m.) 14.3%	Voice of America (8:00 p.m.-3:59 a.m.) 13.9%	Radio Liberty (8:00 p.m.-3:59 a.m.) 6.5%	Local Television (6:00 p.m.-midnight) 5.9%	Izvestia 4.7%	All-Union Television (6:00 p.m.-midnight) 4.2%
2. Reports of pro-Soviet or anti-U.S. reactions	Local Radio (5:30-8:29 a.m.) 10.3	Local Television (6:00 p.m.-midnight) 8.6	Pravda 8.2	Voice of America (8:00 p.m.-3:59 a.m.) 8.2	All-Union Television (6:00 p.m.-midnight) 7.1	Komsomolskaya Pravda 6.2
3. Reports of pro-U.S. or anti-Soviet reactions	Voice of America (8:00 p.m.-3:59 a.m.) 17.8	Radio Liberty (8:00 p.m.-3:59 a.m.) 14.6	All-Union Radio (9:30 p.m.-5:29 a.m.) 10.2	British Broadcasting Corporation (8:00 p.m.-3:59 a.m.) 8.2	British Broadcasting Corporation (8:00 a.m.-7:59 p.m.) 4.2	All-Union Radio (Noon-2:59 p.m.) 3.9
4. Soviet allegations of U.S. hostility towards Cuba	All-Union Radio (6:00-9:29 p.m.) 17.9	Local Television (6:00 p.m.-midnight) 12.2	All-Union Television (6:00 p.m.-midnight) 10.9	Local Radio (5:30-8:30 a.m.) 9.6	All-Union Radio (5:30-8:30 a.m.) 7.2	Local Radio (6:00-9:30 p.m.) 7.2
6. U.S. threats directed against the Soviets	Voice of America (8:00 p.m.-3:59 a.m.) 30.2	All-Union Radio (6:00-9:29 p.m.) 18.4	Radio Liberty (8:00 p.m.-3:59 a.m.) 10.5	Local Radio (6:00-9:30 p.m.) 7.4	British Broadcasting Corporation (8:00 p.m.-3:59 a.m.) 4.1	All-Union Television (6:00 p.m.-midnight) 3.6
7. Soviet threats directed against the U.S.	Voice of America (8:00 p.m.-3:59 a.m.) 20.3	All-Union Radio (6:00-9:29 p.m.) 18.1	Radio Liberty (8:00 p.m.-3:59 a.m.) 9.1	Local Television (6:00 p.m.-midnight) 8.0	Local Radio (6:00-9:30 p.m.) 7.2	All-Union Television (6:00 p.m.-midnight) 7.1

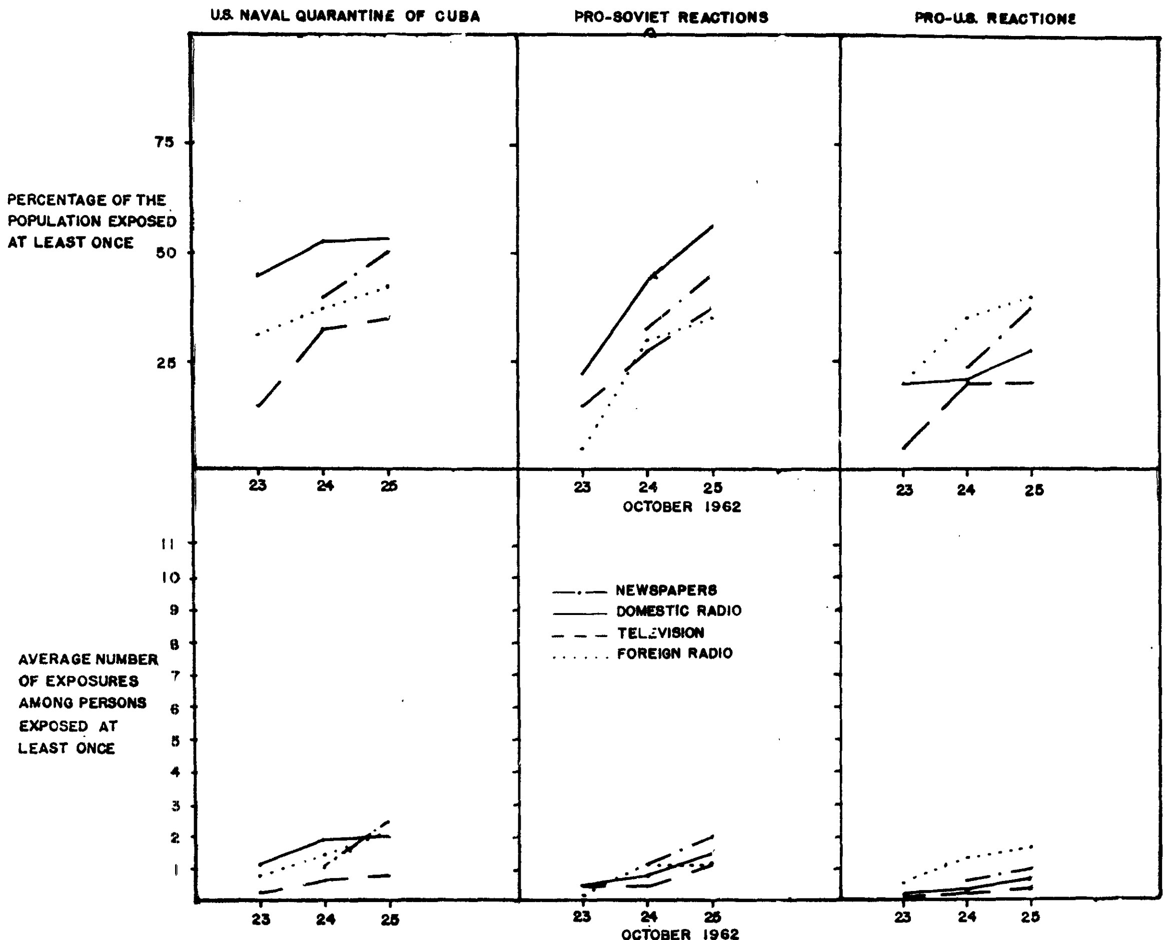
*Exposure outcomes for theme 5 are not shown for reasons discussed in the footnote to Table 6.8.

The comparatively greater importance of the Russian press in reporting both the quarantine story and pro-Soviet or anti-American aspects of the crisis is perhaps attributable to the analytical-explanatory character of these two themes, as compared with the emotional-hortatory nature of theme 4, for which Soviet electronic media--both individually and in the aggregate--served as the more important vehicles.

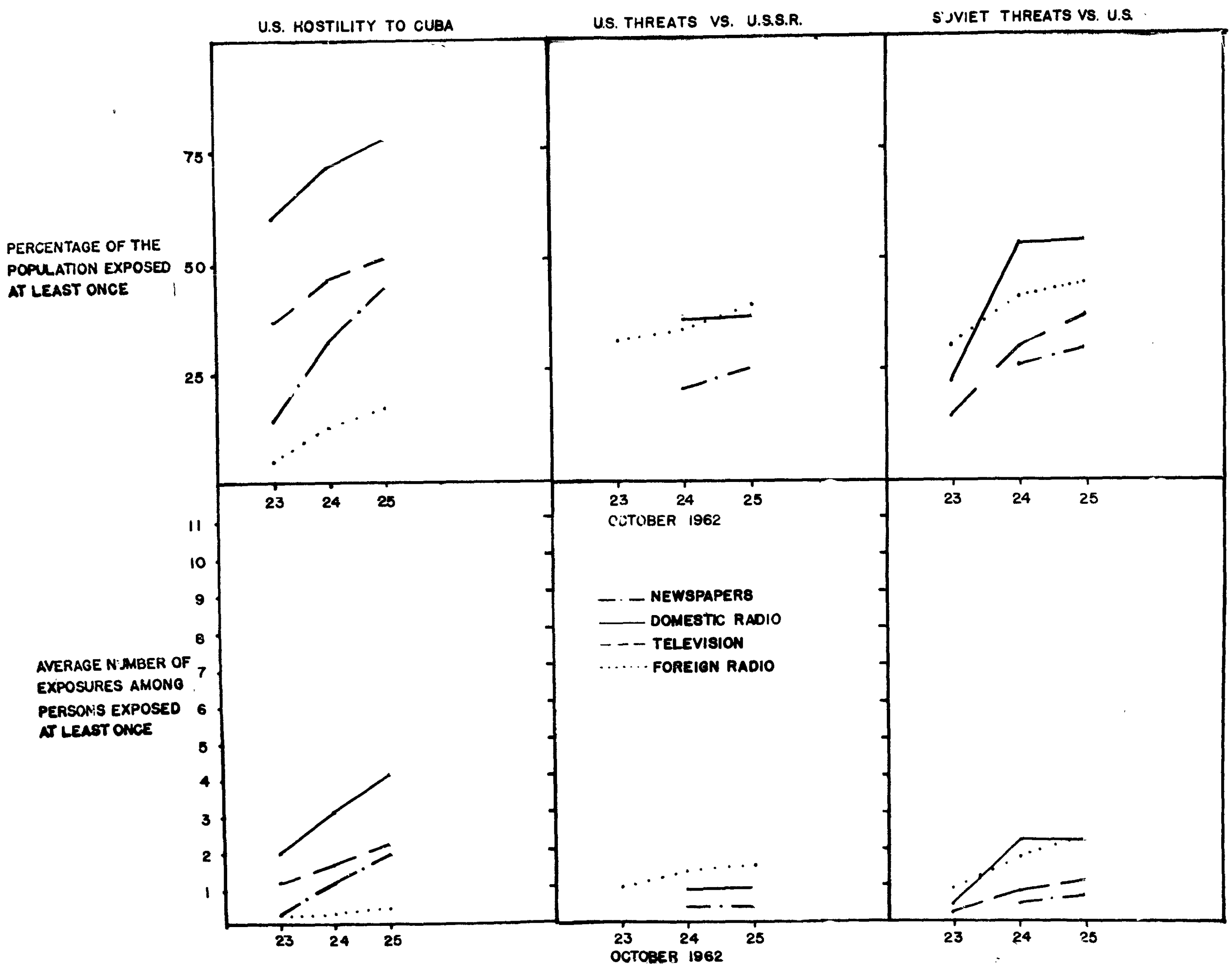
Foreign radio media accounted for the two largest proportions of exposures to theme 3, and nighttime Voice of America was the single most important channel for each of themes 6 and 7. A Soviet medium, all-Union evening radio, was the second most important source for each of the latter two themes, however. The average audiences of nighttime Voice of America and evening all-Union radio (for VOA 20.4 per cent of the population, for all-Union evening radio 34.3 per cent) indicate that the greater number of exposures to themes 6 and 7 via the foreign radio station than the Soviet medium cannot be accounted for by the differences in their audiences. Instead, it must be attributed to the number of stories carried and the formatting of these stories in each medium. In other words, foreign radio media appear to have played a key role during the Cuban crisis in apprising the Soviet population of threats (explicit and otherwise) passing between their country and the United States.

Graphs 6.8 and 6.9 show the buildup of the simulated Soviet population's cumulative and repeat exposure to Cuban crisis themes, over a period of several days, via each of the media types discussed above. The bottom portion of these graphs, showing average theme exposures per person among those exposed at least once, reveals virtually the same pattern of differences across media types after three time periods that was observed in Table 6.11, which listed total theme exposures for the population as a whole. To summarize, the pattern is: foreign radio the most important media type for themes 3, 6, and 7, followed in all but the case of theme 3 by Soviet domestic radio; Soviet newspapers the second most important channel for theme 3 (here again reflecting, perhaps, the explanatory-analytic character of the theme); Soviet newspapers the most important source for themes 1 and 2, followed by foreign radio in one case and Soviet domestic radio in the other; Soviet domestic radio far and away the most important single channel for theme 4.

Analysis of the population's cumulative and repeat exposure after each of the first two crisis days provides a different and equally important basis for comparing the various media types. Simulated exposure outcomes for these early stages highlight the leading role played by Soviet domestic radio as the first source of crisis



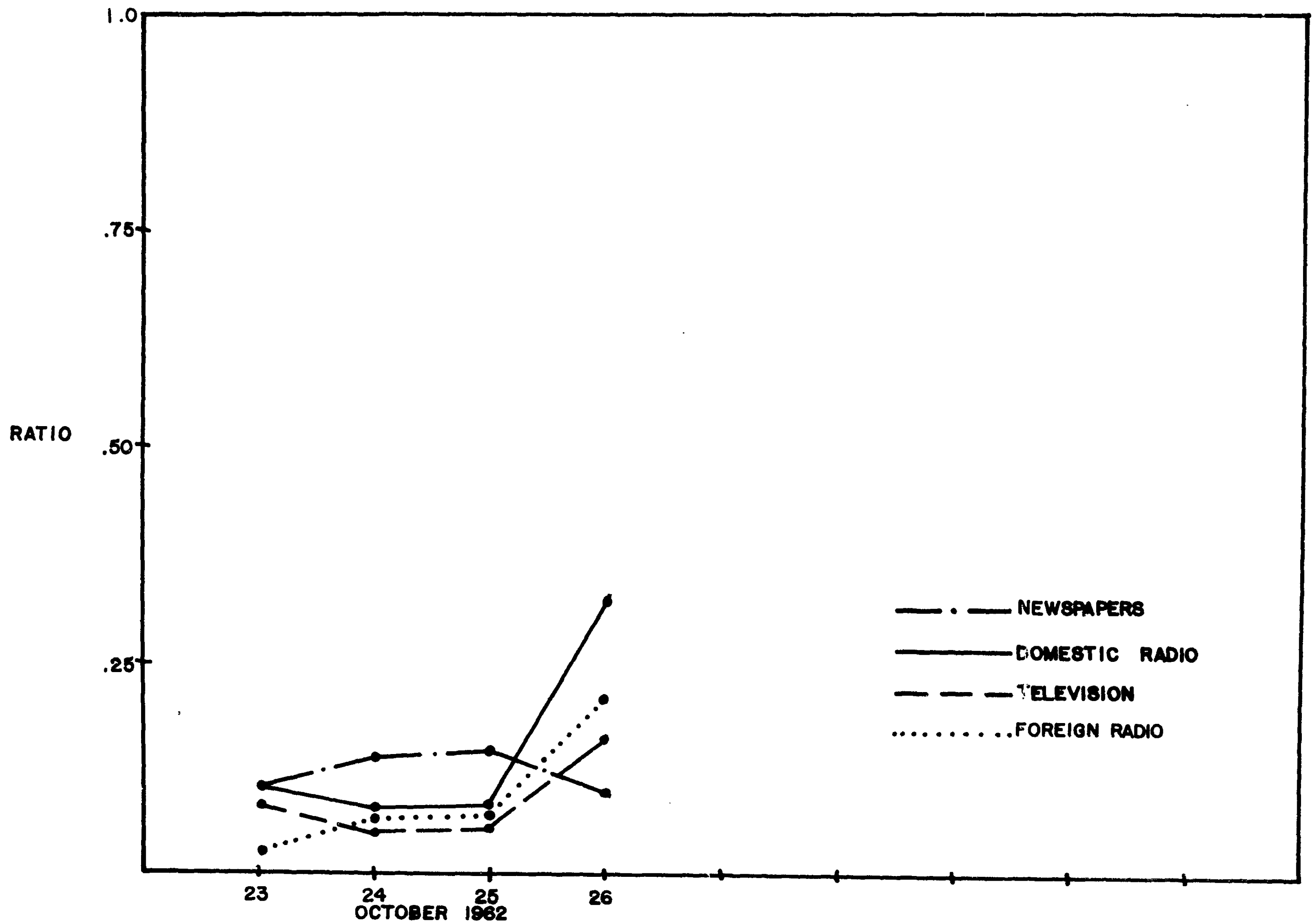
Graph 6.8-- CUBAN CRISIS: REACH AND FREQUENCY BY MEDIA TYPE (THREE THEMES)



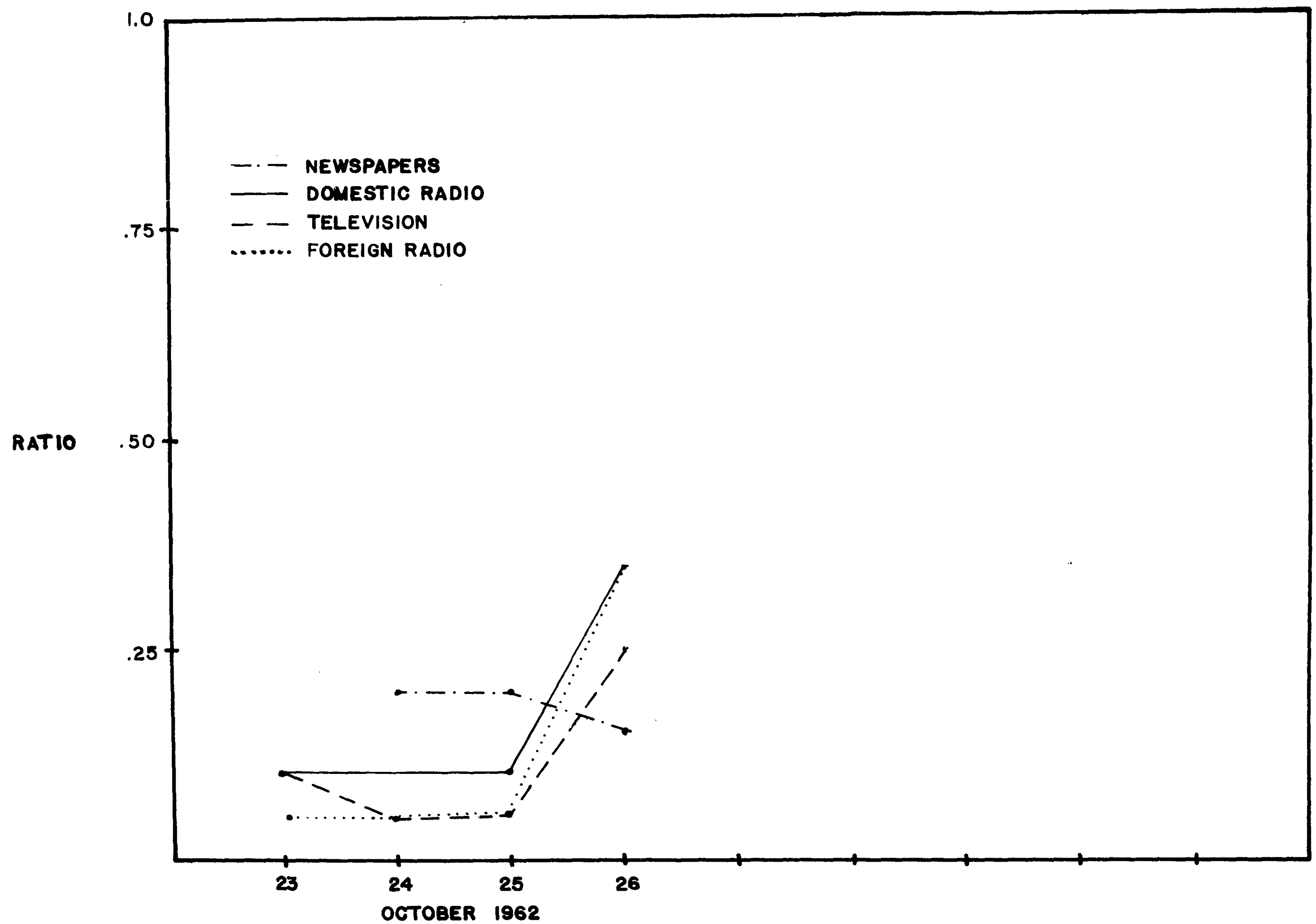
Graph 6.9-- CUBAN CRISIS: REACH AND FREQUENCY BY MEDIA TYPE (THEMES)

information for most Russians. During the initial forty-eight hours of the crisis, Soviet radio accounted for the largest percentage of the population exposed to all but themes 3 and 6. In addition, it appears that by the end of the first day, while only foreign radio had reached the Soviet population with explicit accounts of American threats directed against the USSR, at the same time almost half the population had learned about the quarantine--an implicit American threat--via Soviet radio. Moreover, during the first day fully as many Russians heard accounts of pro-American world reaction over Soviet domestic radio as over foreign radio. Graphs 6.14 and 6.15 also reflect the difference between the reaction times of electronic and print media. By the end of the first crisis day Soviet newspapers had accounted for exposures only to theme 4 and ranked far behind domestic radio and television as a carrier of this theme.

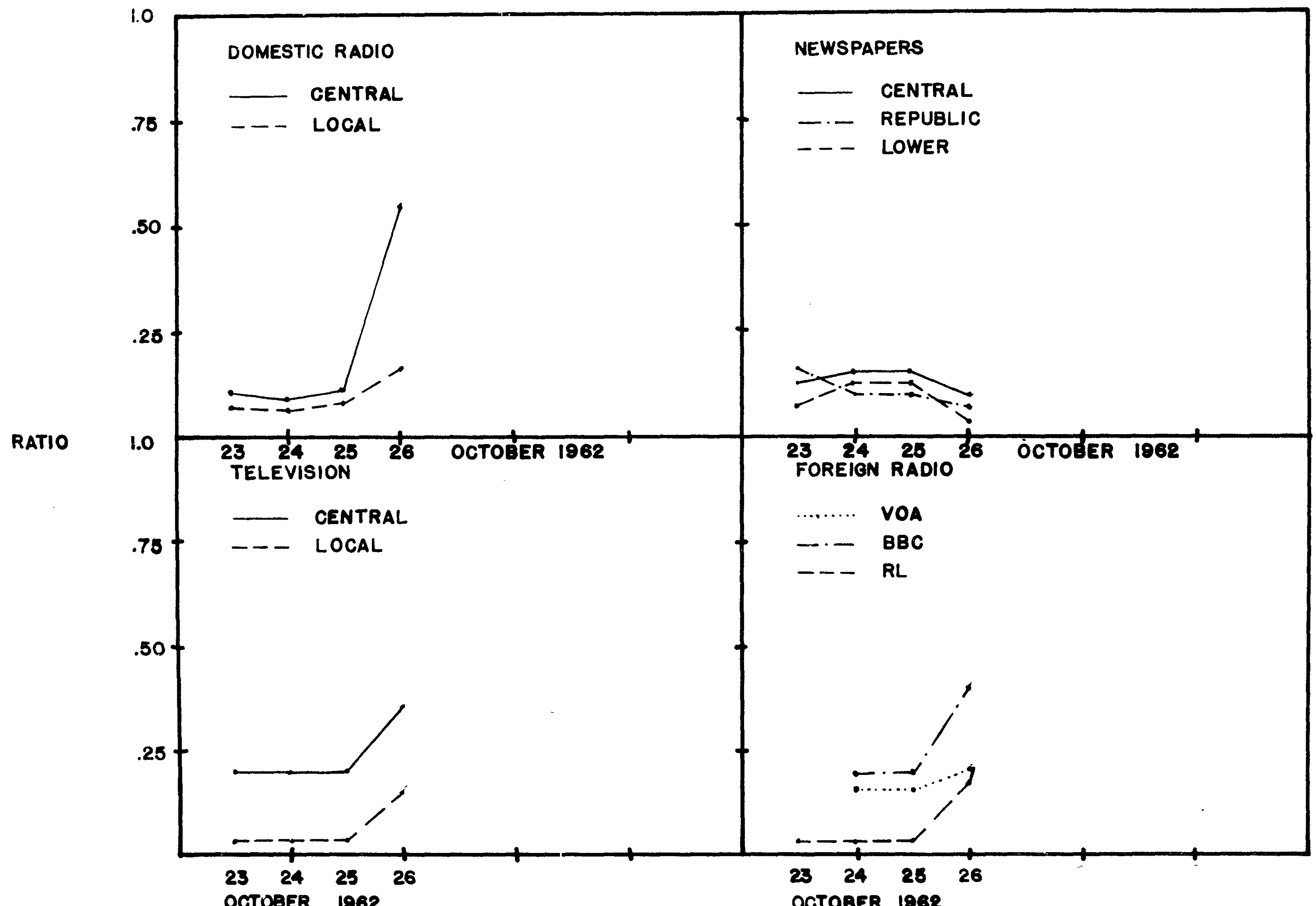
Another way to compare the diffusion characteristics of various types of media is to rate each of them with some kind of "efficiency" measure. Graphs 6.10 through 6.13 show, for two of the Cuban crisis themes, the ratio of actual to potential exposures via each media type and via selected groups of media within each type, over several days of the scenario. For a given media type or group "actual exposures" is the expected number of exposures of



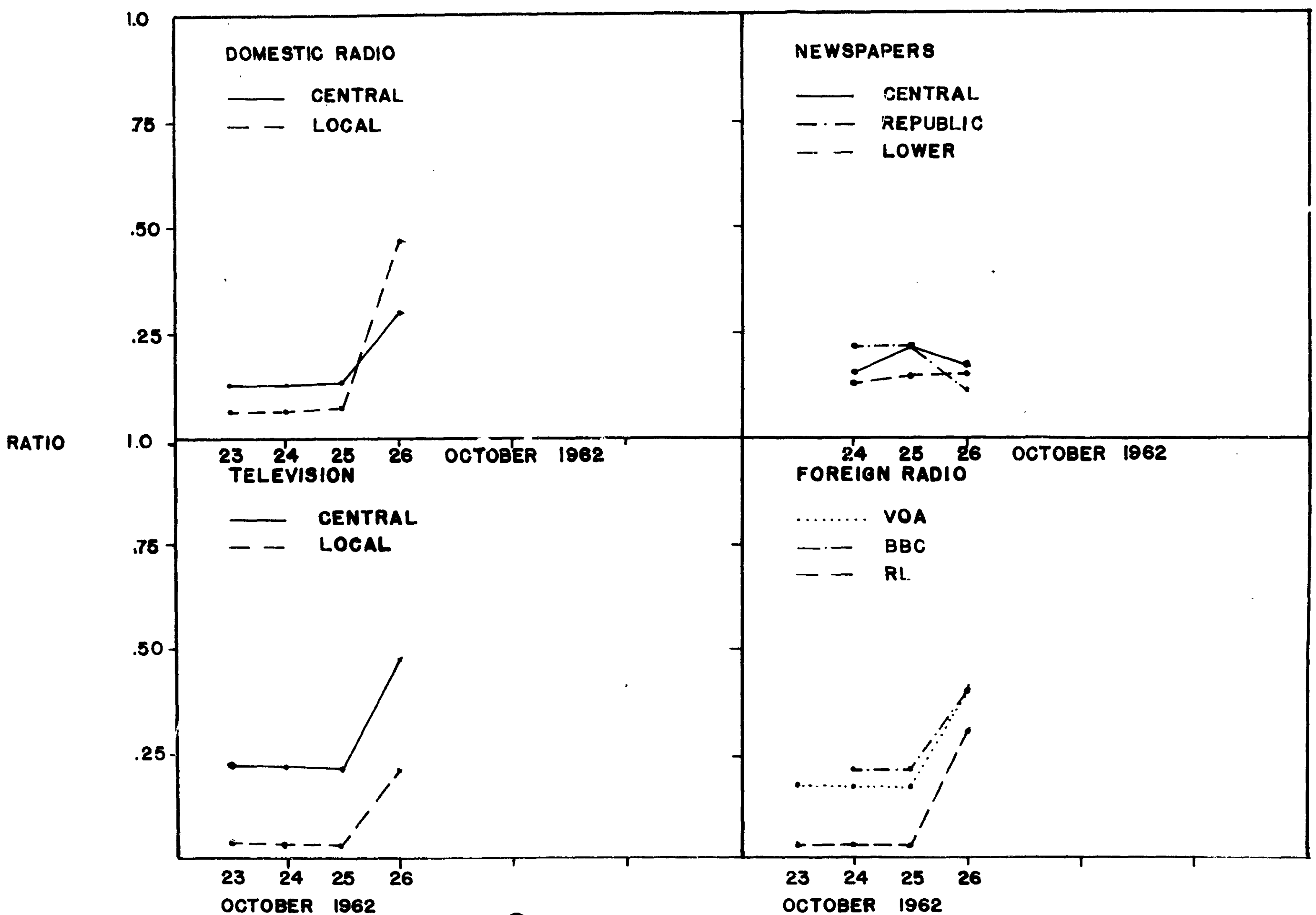
Graph 6.10-- CUBAN CRISIS: RATIO OF ACTUAL TO POTENTIAL EXPOSURES BY MEDIA TYPE (PRO-SOVIET REACTIONS)



Graph 6.11-- CUBAN CRISIS: RATIO OF ACTUAL TO POTENTIAL EXPOSURES BY MEDIA TYPE (PRO-U.S. REACTIONS)



Graph 6.12--CUBAN CRISIS: RATIO OF ACTUAL TO POTENTIAL EXPOSURES BY SELECTED MEDIA (PRO-SOVIET REACTIONS)



Graph 6.13-- CUBAN CRISIS: RATIO OF ACTUAL TO POTENTIAL EXPOSURES FOR SELECTED MEDIA (PRO-U.S. REACTIONS)

the simulation population via that type or group. "Potential exposures" is the maximum possible number of exposures that could have occurred, i.e., the number of exposures that would have resulted if the entire audience of each medium within the type or group had been exposed to every message appearing in that medium. Accordingly, the value of this "efficiency" ratio can range from 0.0 to 1.0. Over the first three time periods we observe the following pattern: Soviet newspapers significantly more efficient in their message "throughput" than either Soviet domestic electronic media or foreign radio; Soviet domestic radio somewhat more efficient than foreign radio and the latter slightly more so than Soviet television; all-Union newspapers more efficient than subRepublic papers and the latter more so than Republic papers; all-Union radio more efficient than local radio; all-Union television more efficient than local television; the British Broadcasting Corporation slightly more efficient than Voice of America and both significantly more so than Radio Liberty. These patterns probably prevailed across all of the Cuban crisis themes since they hold, in every case but one (all-Union, subRepublic, and Republic papers), for the two most antithetical themes in the scenario: pro-Soviet and pro-American reactions.

The ratio of actual to potential exposures for a given theme in a given type of medium is a function of (1) the formatting of messages carrying the theme within the individual medium of that type, and (2) the ratios of average exposure probabilities along each dimension level for that theme and media type.[1] Bearing this in mind the simulation outcomes illustrated in Graphs 6.10 through 6.13 are not surprising. They reflect the following rather well-known facts about the Soviet media system in the early 1960's: Newspapers were the medium of the better-educated who, because of their reading habits, were more likely to have read newspaper articles to which they were exposed than the less-educated; radio was the principal news medium for the Soviet masses while television, for those who had access to it, served primarily an entertainment function; the better-educated and more media-immersed segments of Soviet society were likely to have read either an all-Union and a subRepublic or a Republic and subRepublic newspaper, their less educated countrymen to have read either a Republic or a subRepublic newspaper (recall the duplication tables specified in Chapter IV);

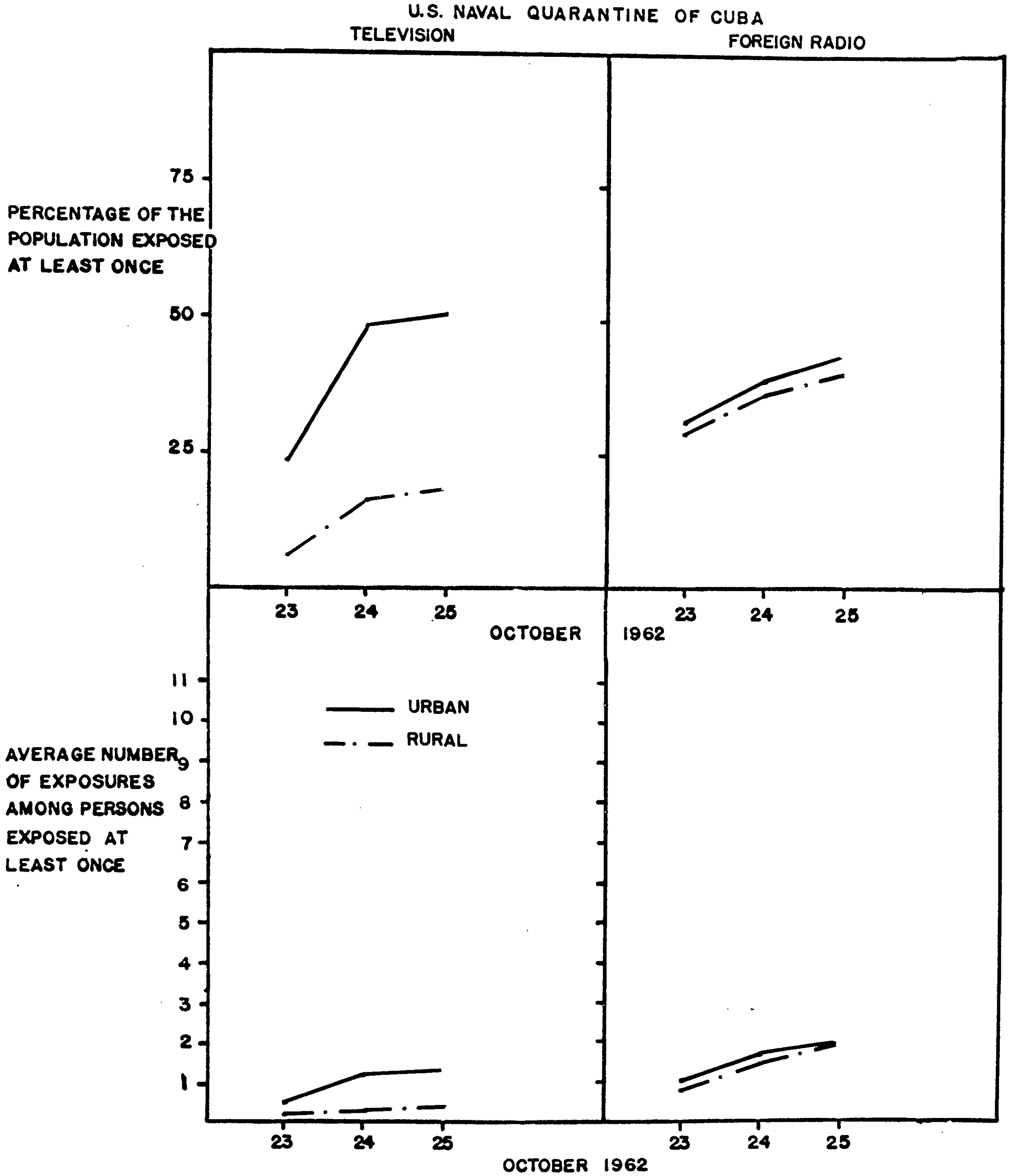
---

[1]The ratios of average theme-exposure probabilities influence a given media type's efficiency by influencing the distribution of the audience of that type of medium over each population dimension.

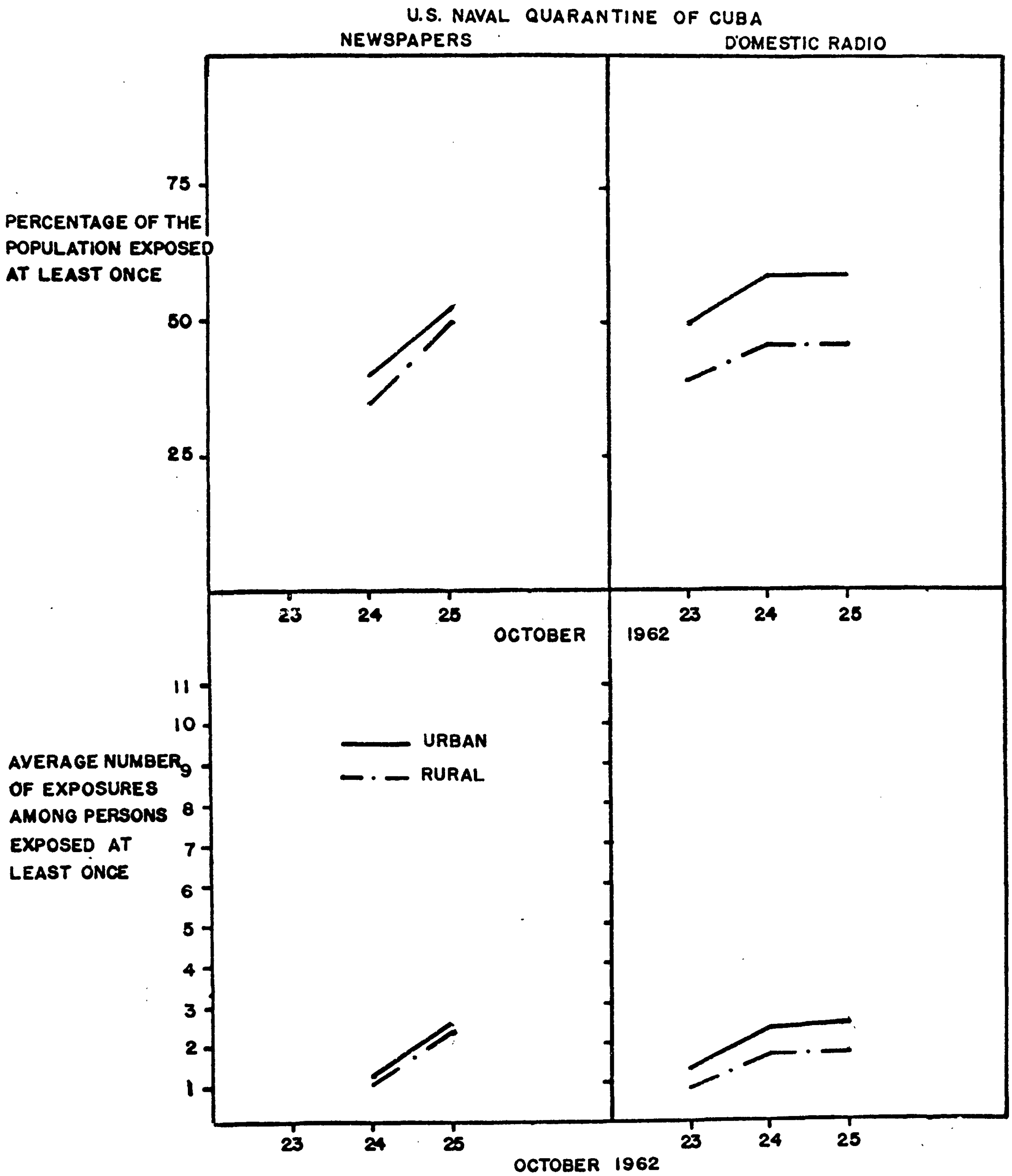
better-educated and more media-immersed persons in the USSR were more likely to have listened to all-Union radio and television stations than to local stations, the reverse being the case for the less well-educated; of the foreign radio stations broadcasting to the USSR, the BBC enjoyed the best reputation, followed by VOA, while RL was generally looked on as the least objective source of outside news. These broad characteristics were reflected in both the format factors and ratios of average theme-exposure probabilities specified in Chapter V, and they are consistent with the simulation outcomes regarding the relative efficiency of the various media types.

The simulation results pictured in Graphs .10 through .13 suggest that the Soviet population's normal media habits are such that less than one-quarter of the message-individual pairs for any theme in the mass media result in an exposure, regardless of the type of medium involved. This finding indicates that the average Russian reads less than one-quarter of the material in any newspaper he picks up and attends to less than twenty-five per cent of the program content that comes over the radio or television he turns on, a result consistent with Western data.

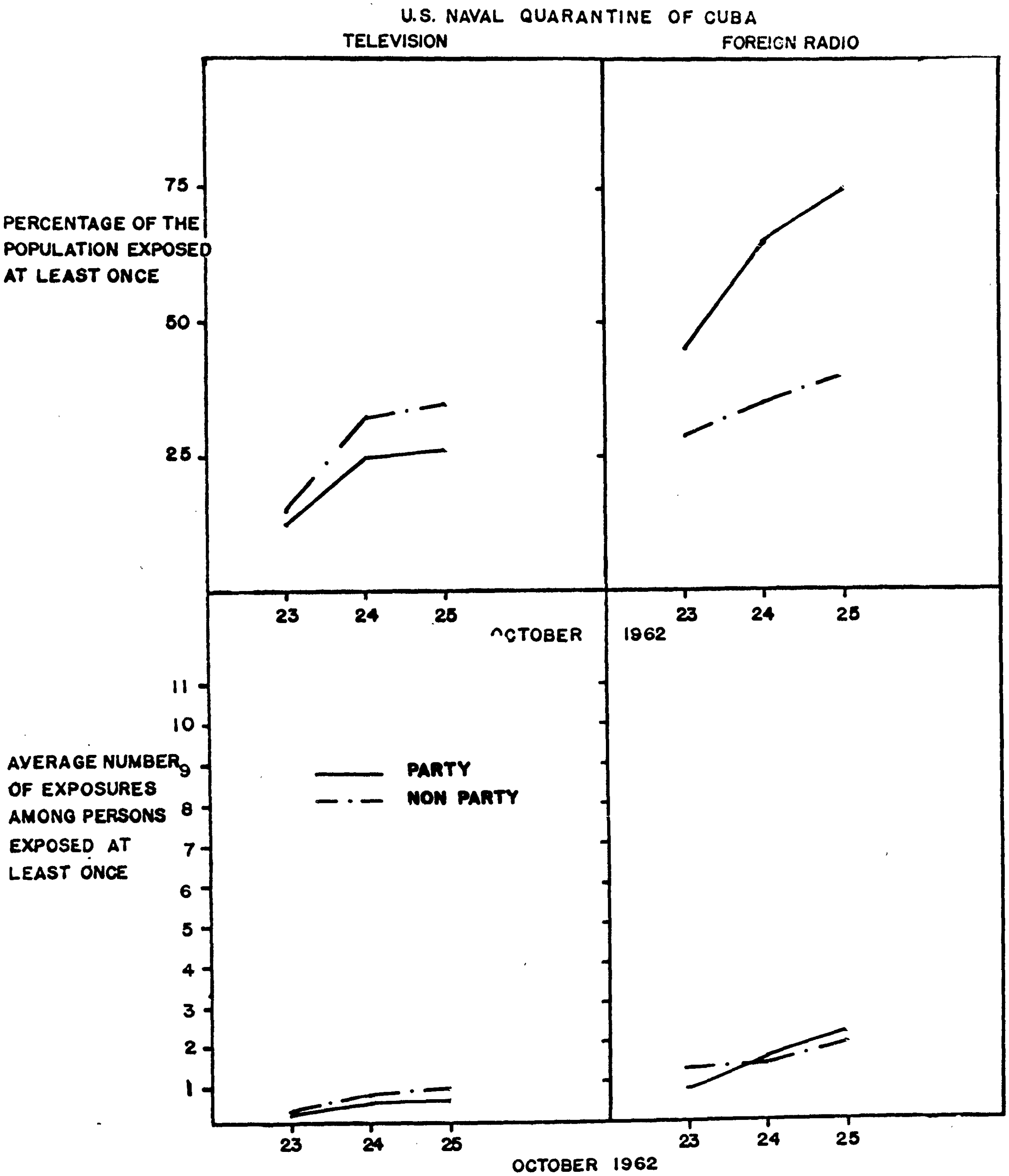
The final set of exhibits, Graphs 6.14 through 6.23, show, for the persons on each dimension level of the



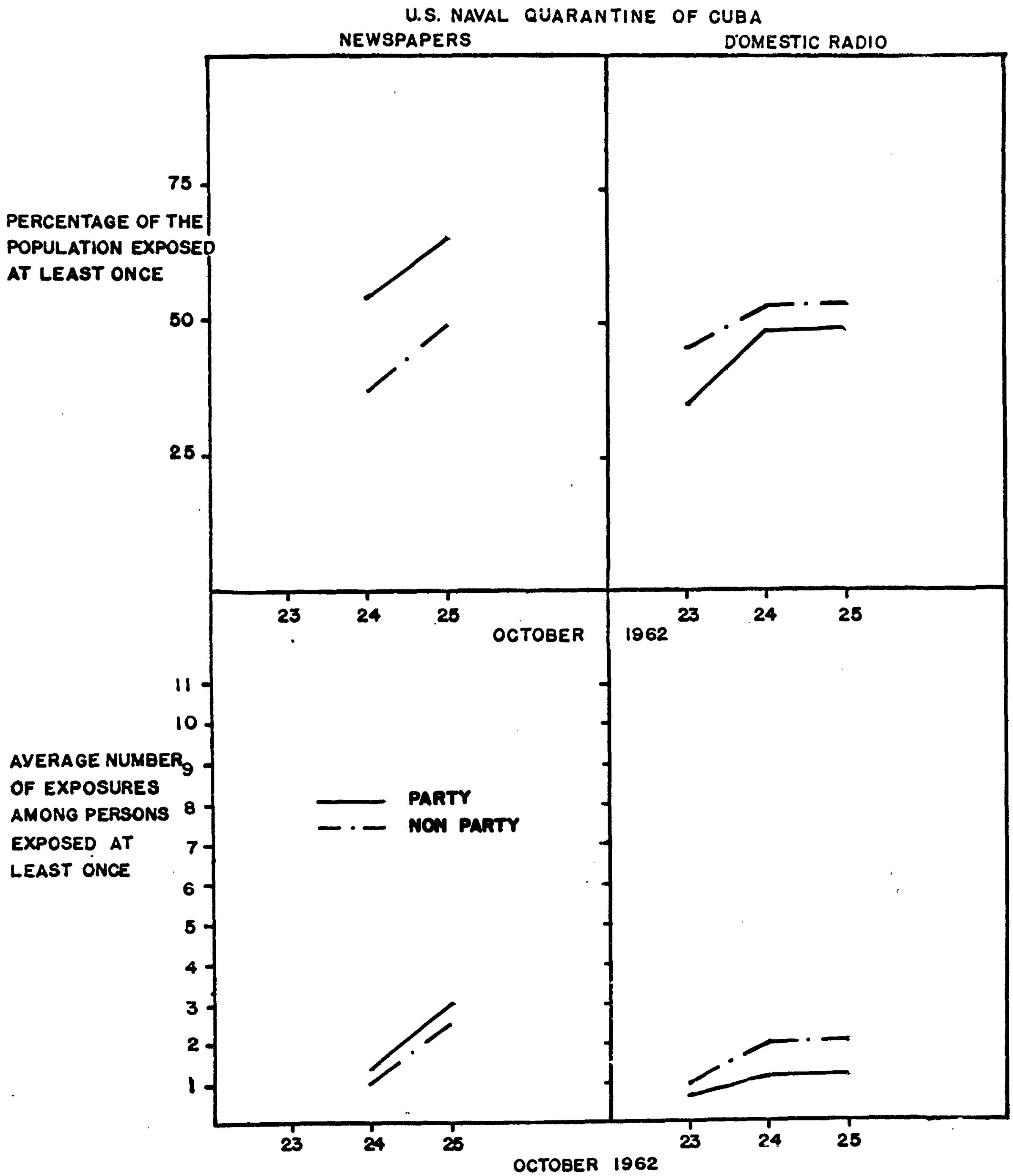
Graph 6.23-- CUBAN CRISIS: REACH AND FREQUENCY BY RESIDENCE (TELEVISION AND FOREIGN RADIO)



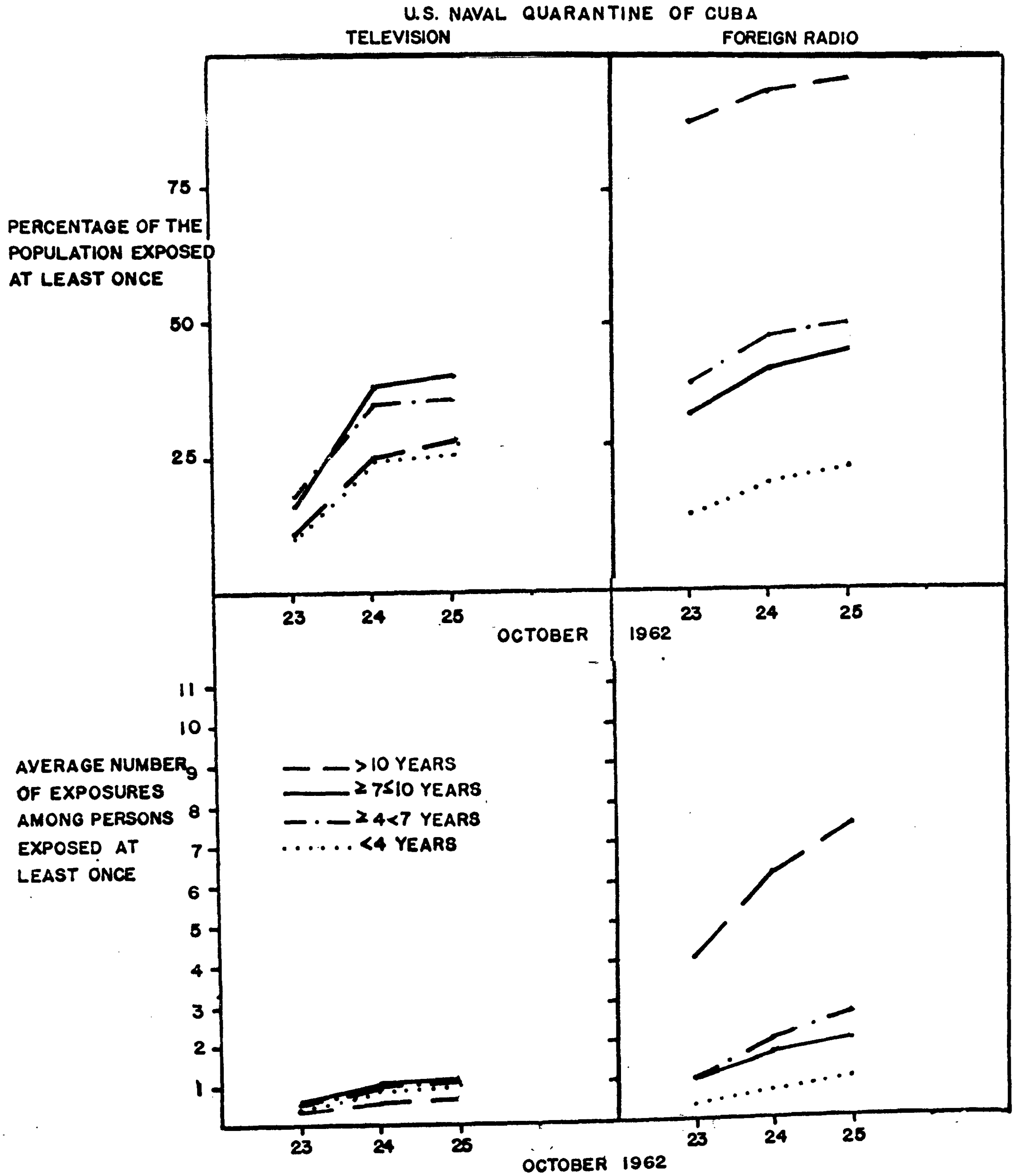
Graph 6.22-- CUBAN CRISIS: REACH AND FREQUENCY BY RESIDENCE (NEWSPAPERS AND DOMESTIC RADIO)



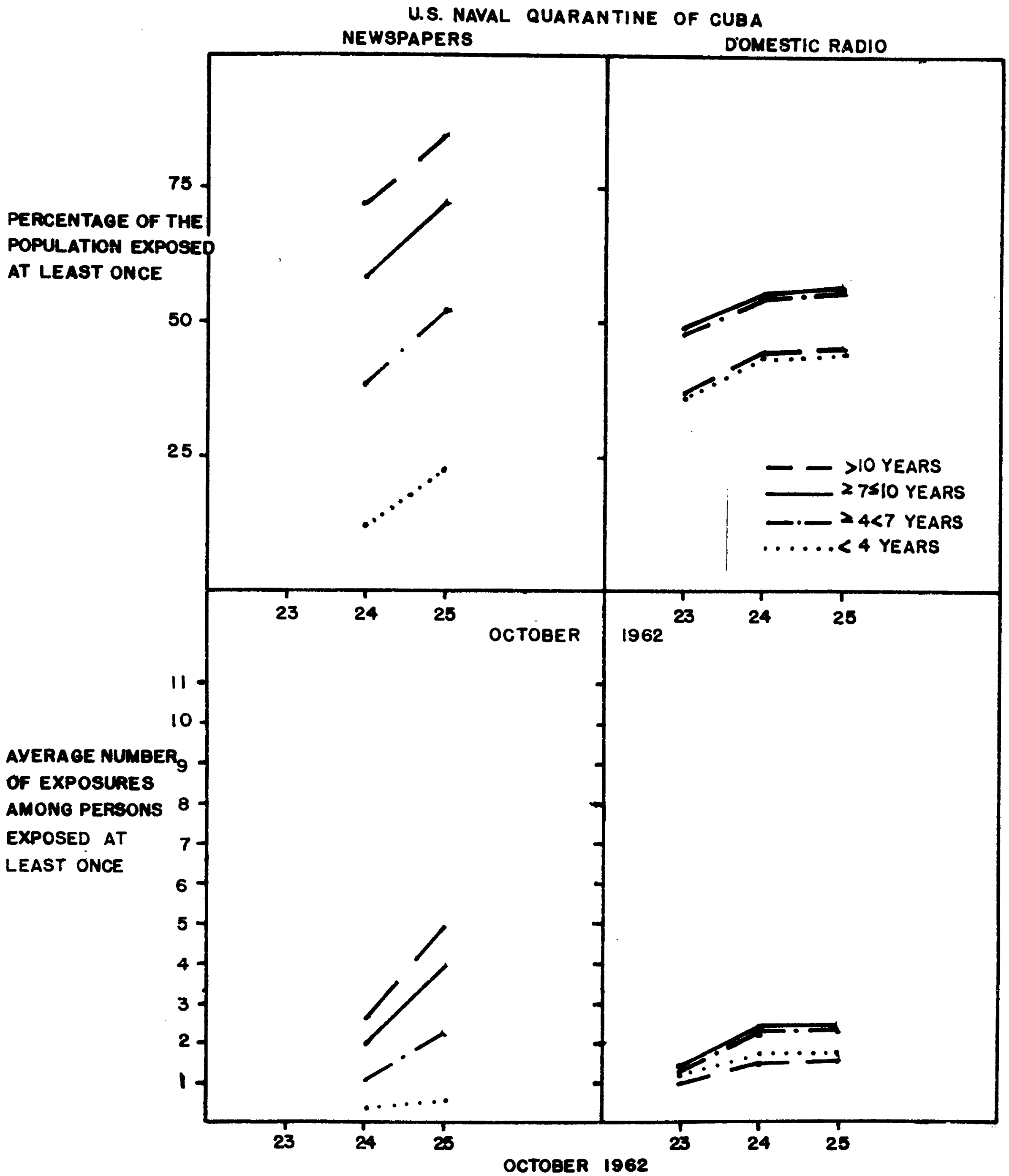
Graph 6.21-- CUBAN CRISIS: REACH AND FREQUENCY BY PARTY MEMBERSHIP (TELEVISION AND FOREIGN RADIO)



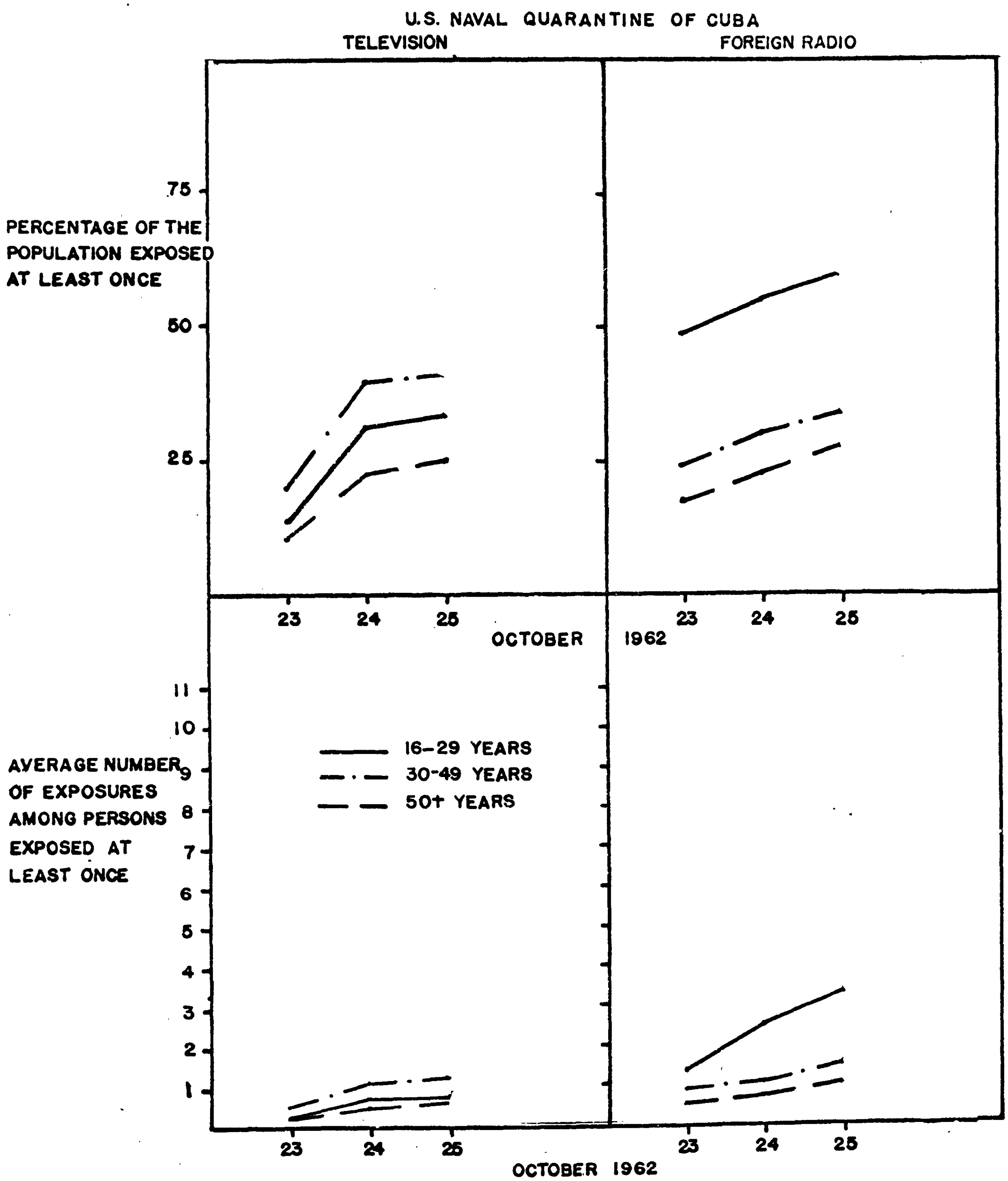
Graph 6.20-- CUBAN CRISIS: REACH AND FREQUENCY BY PARTY MEMBERSHIP (NEWSPAPERS AND DOMESTIC RADIO)



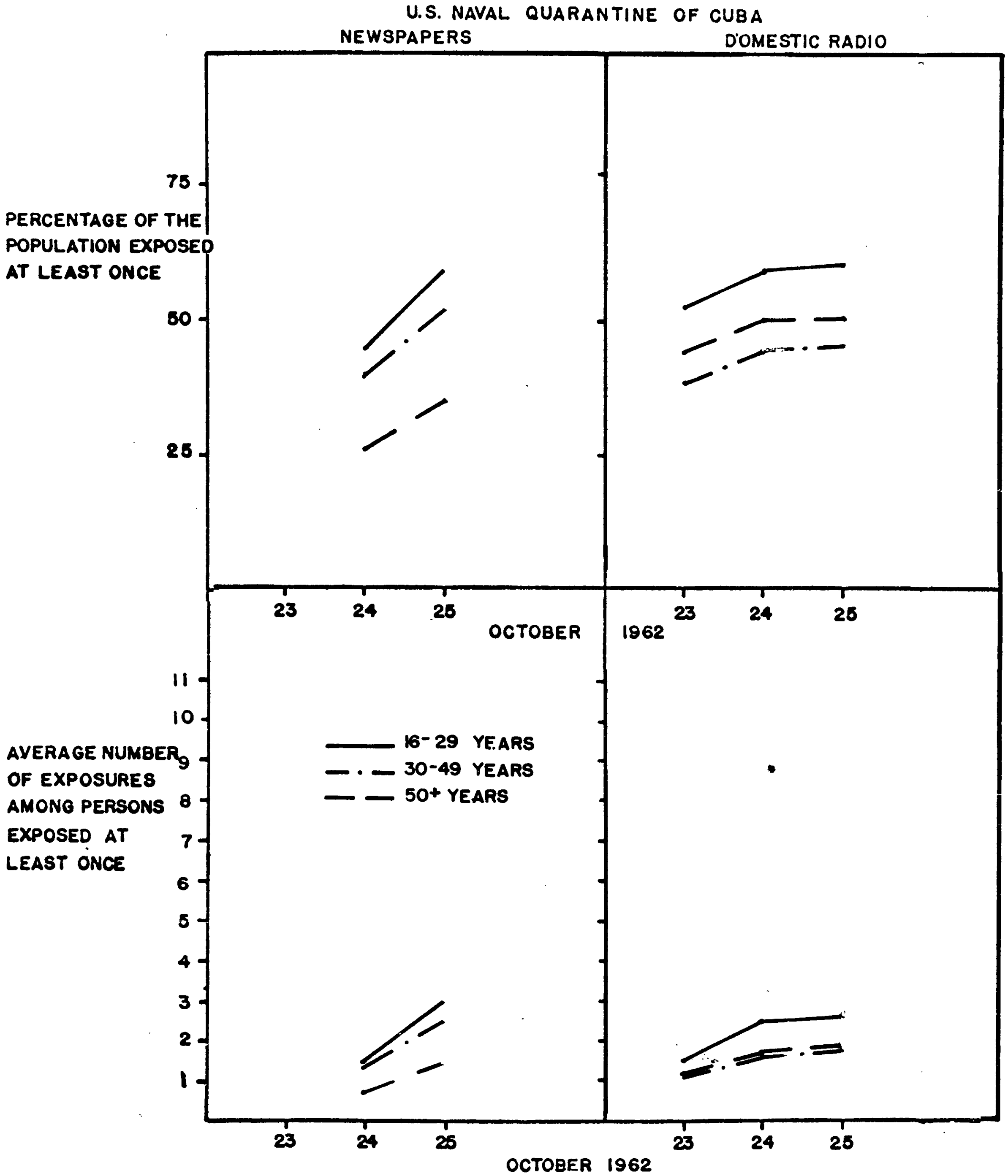
Graph 6.19--CUBAN CRISIS: REACH AND FREQUENCY BY EDUCATION (TELEVISION AND FOREIGN RADIO)



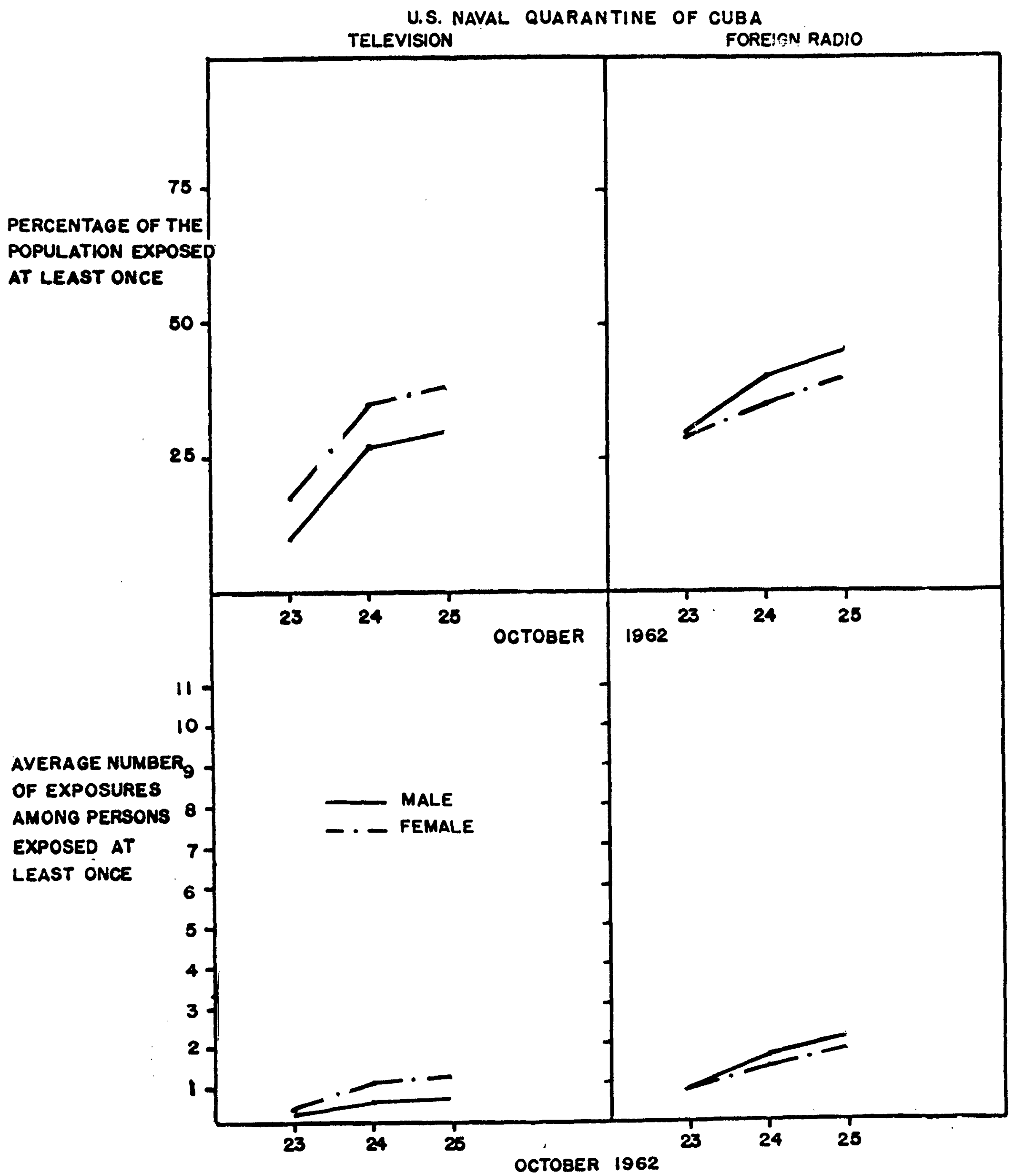
Graph 6.18--CUBAN CRISIS: REACH AND FREQUENCY BY EDUCATION (NEWSPAPERS AND DOMESTIC RADIO)



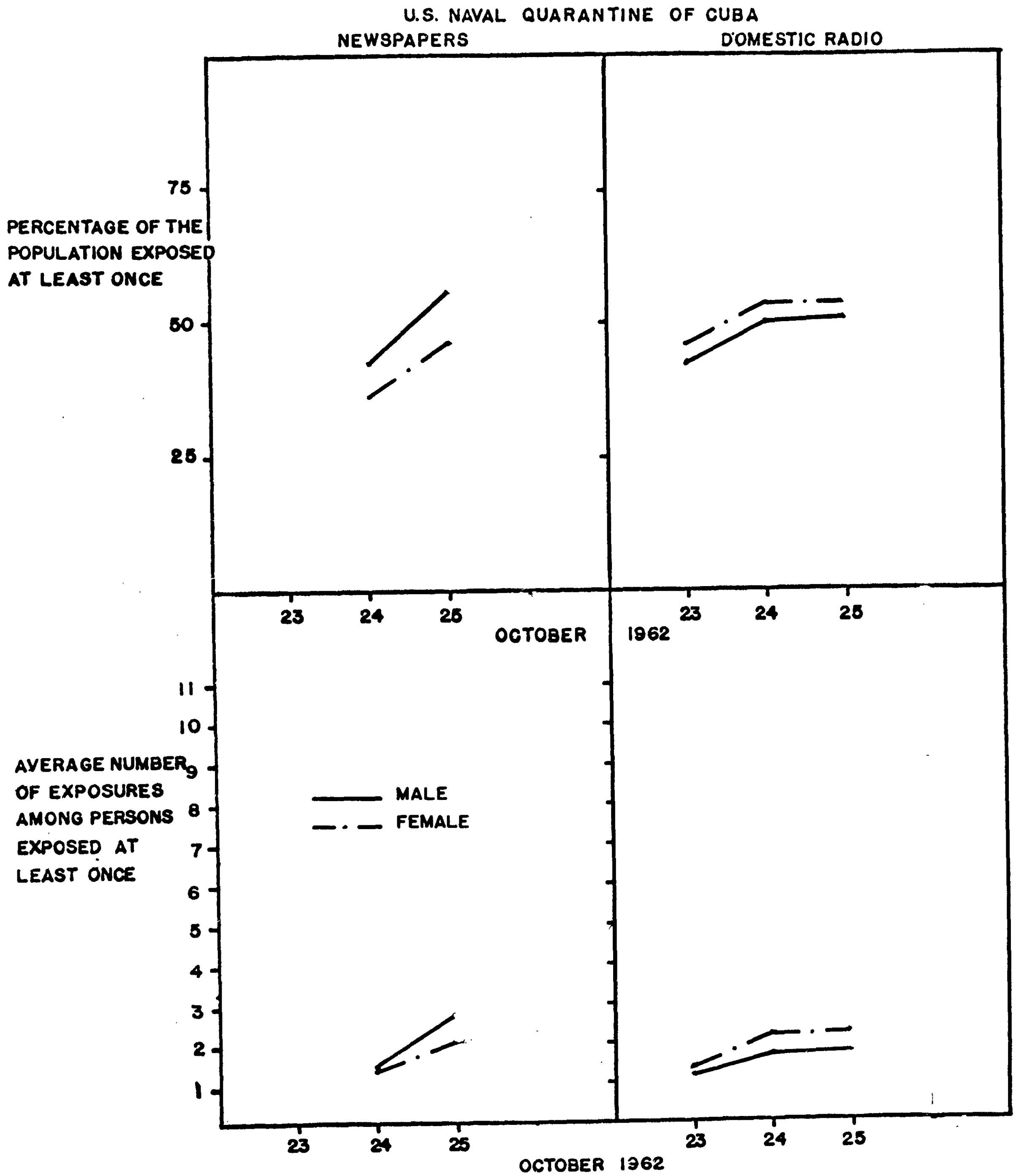
Graph 6.17-- CUBAN CRISIS: REACH AND FREQUENCY BY AGE (TELEVISION AND FOREIGN RADIO)



Graph 6.16--CUBAN CRISIS: REACH AND FREQUENCY BY AGE (NEWSPAPERS AND DOMESTIC RADIO)



Graph 6.15--CUBAN CRISIS: REACH AND FREQUENCY BY SEX (TELEVISION AND FOREIGN RADIO)



Graph 6.14--CUBAN CRISIS: REACH AND FREQUENCY BY SEX (NEWSPAPERS AND DOMESTIC RADIO)

simulated Soviet population, and for each media type, the buildup of cumulative and repeat exposure to the theme of the U.S naval quarantine. There are several interesting features of these data. First, we observe that the simplest pattern is on the dimension of "residence." Urbanites were more heavily exposed than rural residents to quarantine news by each of the four media types. The differences were smallest for newspapers and foreign radio, somewhat greater for domestic radio, and greatest for domestic television. These findings reflect the post-War extension of Soviet literacy, the incompleteness of the radio reception network in some rural areas of the USSR during the early 1960's, and the concentration of the Soviet television diffusion network around urban centers at that time.

More interesting are the exposure differences by media type along the dimensions of "age" and "education." For Soviet newspapers and foreign radio we observe that exposure decreases with age and increases with education. This pattern is especially pronounced in the case of foreign radio, and it accounts for the differential impact of that medium in bringing the Western version of Cuban crisis events to various strata of the Soviet population.

For Soviet electronic media the pattern is quite different. Persons between the ages of sixteen and twenty-nine were more heavily exposed to the Cuban crisis theme by Soviet radio than those in the other two age groups, but persons fifty years old or more appear to have been somewhat more heavily exposed than those in the thirty to forty-nine age group. The middle-aged group was more heavily exposed to quarantine news by Soviet television than their younger countrymen, with those fifty or more years of age least exposed via this medium. The two middle education groups appear to have been more heavily exposed to this theme by Soviet electronic media than the best- and least-educated segments of Soviet society.

When we specified ratios of average exposure probabilities along the "age" dimension for Soviet radio and television, we made theme exposure increase with age (Chapter V). Along the "education" dimension we made it decrease slightly with education for domestic radio, and for domestic television we made persons having between seven and ten years of education most heavily exposed, persons with more than ten years of education least exposed, and set persons in the two lowest education groupings at an intermediate exposure level. Bearing these ratios in mind we observe that Graphs 6.16 through 6.19 reflect a disproportionately high representation of young people and a disproportionately low representation of uneducated people in the Soviet radio audience as well as an underrepresentation of older and uneducated persons in the Soviet television audience during the Cuban crisis period. These patterns are consistent with the results of the studies of Soviet communications behavior that we reviewed earlier, and they are also in accord with the findings of Hollander's recent survey.[1]

Graphs 6.14 and 6.15 reveal that males were more exposed to quarantine news via newspapers and foreign radio than females, while the latter were somewhat more heavily exposed via Soviet electronic media.[2] Not surprisingly, Graphs 6.20 and 6.21 indicate that Soviet newspapers were a more important source of quarantine news for Party members than for nonParty members. It is interesting to note, however, that the graphs show Party members also more heavily exposed via foreign radio than nonParty members. The latter, on the other hand, were somewhat more heavily exposed via Soviet radio and

---

[1]Gayle Durham Hollander, "Communications and Social Modernization in the Soviet Union" (unpublished Ph.D. dissertation, Massachusetts Institute of Technology, 1968), pp. 179-244.

[2]These exposure differences also match Hollander's findings, with one exception: She reports on several Soviet time budget studies which show women spending less time viewing television than men (Hollander, "Communications and Social Modernization," p. 224).

television. For the most part, these exposure differences along the "sex" and "political involvement" dimensions reflect the fact that males and Party members were better-educated than females and nonParty members.

The simulation results we have been discussing are quite plausible. They highlight the important role played by foreign radio in bringing the American version of the quarantine story to the Soviet people, the primacy of domestic radio as an early source of information about the Cuban crisis for most Russians, the more rapid and the heavier exposure of the educated, the young, and urbanites, the functioning of newspapers and foreign radio as more significant information channels for better-educated segments of Soviet society, and of radio (and to a lesser extent television) as a relatively more important source of news for the Soviet masses during the Cuban crisis period. These findings are consistent with available data on the dominant features of the Soviet media system in the early 1960's. We turn in the next chapter to the simulation results for the Kennedy assassination to see whether they are equally plausible and in what respects, if any, they differ from the simulated pattern of theme exposures for the Cuban crisis.

CHAPTER VII

SIMULATING SOVIET EXPOSURE TO MASS MEDIA MESSAGES AFTER THE ASSASSINATION OF PRESIDENT KENNEDY

CHAPTER VII

SIMULATING SOVIET EXPOSURE TO MASS MEDIA MESSAGES AFTER THE ASSASSINATION OF PRESIDENT KENNEDY

To explore the implications and consequences of the Comcom simulation model fully we must assess its postdictive capacity under a variety of communications scenarios. In Chapter VI we described the nature and results of one such test for a scenario characterized by rapid diffusion of news--the Cuban missile crisis. In this Chapter we report Comcom simulation results for a communications situation characterized by even more rapid information diffusion--the aftermath of President Kennedy's assassination.

The Assassination of President Kennedy

On Friday afternoon, November 22, 1963, as his motorcade moved through cheering crowds in downtown Dallas, Texas, President Kennedy was fatally wounded by an assassin's bullet. Texas Governor John B. Connally, who, with his wife, had been accompanying President and Mrs. Kennedy in an open car, was also wounded but subsequently recovered. Shortly after President Kennedy had been pronounced dead, Lyndon Johnson took the oath of office as the 36th President of the United

States. The accused assassin was 24-year old Lee Harvey Oswald. On November 24th, while being transferred from the Dallas city jail to the county jail for greater protection, Oswald was shot and killed by a Dallas night club owner, Jack Ruby. The following day President Johnson directed the Justice Department and the FBI to conduct a thorough investigation of the assassination of President Kennedy and the murder of his alleged assassin.

President Kennedy was shot at 1:30 p.m. Eastern Standard Time. He was pronounced dead approximately one-half hour later and another half-hour elapsed before news of his death was made public. We chose to begin the scenario at the latter point and to have it cover the succeeding ten 24-hour time periods. Due to the time difference between Washington and Moscow, however, the aftermath of the assassination actually began for the Soviets on Friday evening, November 22, 1963 at about 9:30 p.m. Moscow Central Time.[1]

Themes Coded for the Content Analysis

Coded for the content analysis of Soviet media material and incoming foreign radio transmissions during the aftermath of President Kennedy's assassination were the following themes:

---

[1]For a chronology of the Kennedy assassination, as well as an outline of significant events preceding the assassination see *The Congressional Quarterly Weekly Report*, XXI, No. 48 (1962), 2065-67 and 2108.

1. The assassination of President Kennedy
2. The swearing-in of Johnson as President
3. The assassination of Oswald
4. The establishment of the Warren Commission[2]

We hypothesized that simulated exposures to theme 1, and to a somewhat lesser extent, to themes 2 and 3, would show the degree of saturation achieved by Soviet media in giving timely and heavy coverage to the assassination and the major developments which followed in its wake. We also assumed that simulated exposures to theme 4 would (1) provide a "light-exposure" measure against which to assess the simulated population's exposure to the first three themes, and (2) indicate the extent to which incoming foreign radio transmissions effectively supplemented the relatively light Soviet media coverage of this theme.

Appendix B contains a brief description of each theme in the content analysis (as it was explained to the coders) and the code sheets that were used for the various media types content analyzed (Tables B.1 - B.6).[3]

---

[2]On November 30th President Johnson appointed a special commission, headed by Chief Justice Earl Warren, to direct a comprehensive investigation of President Kennedy's assassination and Oswald's murder.

[3]Again, but for the limiting factors of storage capacity and run time, several additional themes would have been included in the scenario. Among the more frequently recurring themes not included were: (1) President Johnson's remarks at Andrews Air Force Base; (2) biographies of Kennedy; (3) biographies of Johnson; (4) biographies

The Reconstructed Pattern of Theme Appearances

Soviet press coverage

Overview

Before we review the Kennedy assassination as reported by Soviet media, two things need to be said: First, Soviet media treated the memory of the President with dignity and reported on the sorrow of his family and his nation with sympathy. Second, reports and

---

of Oswald; (5) biographies of Ruby; (6) contentions that the assassination was plotted by right-wing, reactionary, fascist, and monopoly capital groups in the U.S. who opposed Kennedy's policies, including contentions that Oswald was neither a Marxist nor a Cuban sympathizer but rather was a rightist and anti-Soviet, that Ruby and Oswald were accomplices, that the Dallas police and the Texas oil establishment were implicated in the plot, that Ruby was a gangster, that reactionary groups in the U.S. were trying to use the assassination to stir up anti-Soviet and anti-Cuban hysteria, that Senator Goldwater, General Walker and Robert Welch represented these groups, that right-wing media had created an atmosphere of hate in Dallas which fostered the Stevenson incident and, ultimately, the Kennedy assassination, that Oswald's assassination was the result of rightists and gangsters trying to cover up all traces of their plot, that the Dallas police were being deliberately inept in their investigation of the assassination, and including cartoons of Lincoln weeping, of plotters sweeping up their footprints, and of the Reichstag; (7) stories praising Kennedy, including accounts of his war record, his broadmindedness and rationality, his efforts to solve U.S. racial problems, his attempts to deal with international problems through negotiation, and his role in securing a nuclear test-ban treaty; (8) accounts of mourning activities in the U.S., including coverage of the Kennedy funeral ceremonies, other memorial services, and the processional past Kennedy's coffin; (9) speculations on the likely degree of continuity between Kennedy's and Johnson's policies, including accounts of Johnson's staff briefings and his meetings with Mikoyan and Dobrynin, the emphasis in Johnson's first speech to Congress on the importance of continuing Kennedy's policies, and comments on the assassination in Soviet domestic media tended to convey a confused and, even at times, a contradictory account of facts and seeming facts as they unfolded. Moscow propagandists attempted to convince public opinion of the following phenomena, in rapid succession:

1. No suspect has been arrested, but the killer is unquestionably a rabid rightist;

2. Oswald has been arrested, but any effort to link him with Communism is a rightist "provocation", another Reichstag "fire frame-up;" the fact that he was reputedly a self-proclaimed Marxist and Pro-Castroite was being used by the U.S. news media to villify the Communist Party, the Fair Play for Cuba Committee, and Castroite Cuba, if not the Soviet Union itself, in a wild frenzy of rabid war-mongering and rightist racist propaganda;

3. Oswald was not a Marxist anyway; the publications found in his room were Trotskyist, and a "Trotskyite," "as is well known," is the most despicable kind of deviate from Marxism-Leninism;

4. The President's assassination was the result of a plot hatched by "war-mongers" and "racists" and whatever Oswald was, his shooting by Jack Ruby was part and parcel of these ultra-rightist plotters' all-out effort to silence him, with police connivance, thereby sweeping the evidence of the President's assassination under the rug;

5. Oswald must have had an accomplice;

---

assessments of the probable effect of Kennedy's death on East-West relations; (10) condolences sent by Khrushchev, the Soviet government, Soviet organizations, the U.N., and foreign governments to President Johnson, the U.S. government, and Mrs. Kennedy; and (11) descriptions of the social forces in the U.S.--racism, reaction, violence, and corruption--which allegedly provoked the tragedy.

6. Oswald wasn't guilty at all;

7. Oswald was either a rightist or a tool of the rabid rightists, if not one himself, after his "calumnies" against the Soviet Union;

8. A conspiracy of hate killed the President...and let's forget all about Oswald.

Accompanying this campaign was an attempt on the part of Soviet propagandists to create a larger-than-life image of President Kennedy, who began to emerge as a kind of latter day Franklin D. Roosevelt. Soviet propagandists also quickly assigned President Johnson the task of living up to the late President's folk-image.[4]

The first Soviet press report of the assassination appears to have been in the Saturday edition of Pravda on November 23rd. Over the central three columns of the lower half of page one, in three-eighths inch high capital letters, there appeared the following headline:

ASSASSINATION OF USA PRESIDENT

JOHN KENNEDY

The report was made up of TASS dispatches, an obituary, and a three

---

[4]For a description of how Soviet media in general, and the Soviet press in particular, covered the Kennedy assassination, we have relied on an article signed "C.M.", entitled "Kennedy Assasination--Communist Version," in Communist Affairs, I (Nov.-Dec., 1963), 3-6; John L. Dunning, "The Kennedy Assassination as Viewed by Communist Media," Journalism Quarterly, LVI (Spring, 1964), 163-9; translated excerpts from Pravda and Izvestia in Current Digest of the Soviet Press, vol. XV; the conversation with Finkelstein.

by four inch full-face portrait, showing head and shoulders, with the President's name in full, in large bold type.

The first TASS dispatch was the same as the one broadcast by Moscow Radio's Domestic Service the previous evening; it was based on an Associated Press story from Dallas. The second TASS item, from New York and also dated November 22, gave a few more details, fixed the hour of the President's death at 2:00 p.m. New York time, reported the conjecture of "commentators" in Dallas that "this crime" was connected with "the activities of ultra-rightist organizations," and stated that the President had in his pocket a speech he was about to deliver, "condemning his ultra-conservative opponents."

The TASS obituary had been released by that agency at 11:44 p.m. Moscow Central Time on November 22nd. It contained a six-line summary of the President's biography and extensive material on the President's peace efforts, first broadcast by Moscow Radio's Domestic Service in Russian at 4:00 a.m. on Saturday morning, November 23rd. The Kennedy obituary favorably mentioned his speech at American University in Washington, D.C., as well as his "stubborn fight" in the Senate for ratification of the limited test-ban treaty, and tied in his fight against the "rabid ones" with his trip to Dallas, which was presented as connected with the 1964 Presidential elections. In addition, there was a TASS dispatch from Washington which stated that Vice President Lyndon B. Johnson had been sworn in as President of the United States. This dispatch was accompanied by a brief biography.

The November 23rd issue of Izvestia carried no news on the President's assassination. Subsequent editions did carry the story, however.

Izvestia of Sunday, November 24th, had on its first page a two-column spread beginning about three-quarters of the way up from the bottom of the page. Placed below a two-column article on Brezhnev's visit to Iran was a larger version of the same Kennedy photograph that had appeared in Pravda the previous day. The article on Brezhnev had far heavier and larger headlines than the one on Kennedy--one inch high for "TO BE ALWAYS GOOD NEIGHBORS" in two lines, as against three-eighths-inch high capital letters for the "Assassination of USA President John Kennedy." Apparently, the Soviet Chairman's journey to Iran was considered either more newsworthy and/or more important politically.

The lead story in the November 24th issue of Izvestia consisted of the following two lines: "November 22 in the city of Dallas (state of Texas) USA President John F. Kennedy was mortally wounded. After thirty minutes the president died." Although Soviet newspapers invariably used initial capital letters when writing "Chairman of the Council of Ministers of the U.S.S.R. N. Khrushchev" or "Chairman of the Presidium of the Supreme Soviet L. Brezhnev," they did not use an initial capital in "president" in this story, though they did in the telegrams of condolence.

The latter appeared after a story on the visit of Khrushchev and Gromyko to the American Embassy in Moscow to express their condolences in person. Then came a brief notice informing readers that dispatches by Izvestia's own correspondents could be found on page two. Under this notice were the official communications of condolence by Khrushchev to President Johnson and Mrs. Jacqueline Kennedy, by Brezhnev to President Johnson, by Nina Petrovna Khrushchev to Mrs. Jacqueline Kennedy, and by Gromyko to Secretary of State Dean Rusk. On page two, along with a four by three and one-quarter inch photograph of President Johnson with Mrs. Johnson and Mrs. Kennedy, were published dispatches by Izvestia's own correspondents under a two-line headline of one-half inch high capital letters:

USA SHAKEN BY KENNEDY DEATH

with subheads in smaller capital letters--"United States of America in Mourning;" "Coffin With Body of President Kennedy Placed in White House;" "New USA President Lyndon Johnson Takes Oath Aboard Plane," "Telegrams of Condolence From All Over the World." The first of these dispatches--occupying twenty-seven and one-half column-inches in a three-column spread and dated New York, November 23rd--was by S. Kondrashov. It was, for the most part, a well-written factual account.

In the next to last paragraph it stated: "Many Americans connect the assassination of Kennedy with the activity of ultra-right, fascist elements." It then quoted a New York City woman, "Maurine Varga," as having told the New York Post that "A man can get killed in Texas. They spat in Stevenson's face. What have they done to the

President?" and explained what had happened in Dallas on October 24th, when the ultra-rightists, calling to put an end to the U.N., spat in the face and struck with a placard the U.S.A. representative in the U.N. Stevenson." It recalled that Dallas was "famous" as a "den of the Birchites" and other "rabid ones." There, for example, the story continued, "lives the retired major-general, the semi-fascist Walker, who considers Eisenhower and Kennedy 'Communists' and who last fall headed up a bloody riot at Mississippi University when the negro...Meredith was admitted."

The second dispatch, transmitted by telephone by Izvestia's Washington correspondent, was featured under a one-eighth inch high headline in initial capital letters: "Washington In Mourning." Signed by I. Itskov, it was six and three-quarter column-inches in length, dealt with reactions to the assassination and quoted an unnamed Negro woman, who, "clenching in her hands the newspaper with the report of the President's death, exclaimed: 'This is the handiwork of the racists! They took vengeance on him!'"

Literaturnaya gazeta of November 23rd, in a three-column spread on the right under the caption of "last minute news," and under the three-eighths inch high headline:

PRESIDENT KENNEDY'S DEMISE

published two TASS dispatches from New York that covered almost nine column-inches. One of these dispatches also reported that "Commentators who were in Dallas connected this crime directly with the activities of ultra-rightist organizations."

After Russian television audiences saw with their own eyes the assassination of Lee Harvey Oswald by Jack Ruby on the 24th, Soviet commentators and journalists had little trouble convincing most of them that the President's assassination had been the result of a premeditated plot. This line of thought continued, with variations and some additions, in all the Soviet mass media throughout the month following the President's assassination. In the November 26th issue of Pravda New York correspondent B. Strelnikov, under the headline "Assassins Sweep Things Under the Rug," noted how strange it was that the Dallas police announced the exact time when Oswald would be transferred from one jail to another, made arrangements to have the transfer televised, and showed on television the plan of the jail corridors through which Oswald would be taken. Strelnikov recalled that gangster Joe Vallachi had ample police protection, "yet here in Dallas the police announced well in advance and in detail the route over which the prisoner would be taken." Then he described the scene as millions had seen it on television the world over and characterized the assassination of Oswald by Ruby as cold-blooded, cynical murder. "Thus the assassins dropped the curtain over the conspiracy of which President Kennedy was the victim."

The same issue of Pravda quoted an article by James Reston in the New York Times of November 25th, as translated by TASS, in which Reston, writing from Washington, D.C., told "a tale of two cities and of two murders. In Dallas--violence and anarchy. In Washington--sorrow, humiliation, and alarm." The "eye for an eye" principle had triumphed in Dallas, wrote Reston, as quoted by Pravda, the country was in revolt against law and order, and the sorrow of individuals was not enough to expiate the country's guilt. Reston cited from the memorial address of Chief Justice Warren the charge that an atmosphere of lawlessness prevails in the United States, "for we know," he said, "that such terrorist acts and murders 'are usually stimulated by the forces of hate and darkness, which today bring demoralization into American life.'" Pravda's commentator, K. Nyepomnyashchii followed Reston with a denunciation of such "ultras and rightist influences as General Edwin Walker, Robert Welch, the John Birch Society, Senator Goldwater, The American Mercury, 'John Franklin's Letters,' Dallas, and the South with its ultra-rightist ideologists and their racial hatreds." Directly below this article was a photograph of Ruby shooting Oswald.[5]

---

[5]The Soviet mass media adduced further evidence for this line of thought in quotations from such other authoritative American spokesmen as Walter Lipmann and Ralph McGill. They later attempted to solidify their case with foreign comments from non-Communist sources. There was, for example, a photograph from Paris-Match which appeared in the December 19th issue of Izvestia, showing a man in broad-brimmed Stetson hat and Western garb examining a show window displaying guns and stating that in Dallas "a Colt is cheaper than a pair of shoes." This photograph appeared as an illustration for the summarized version of a report from Dallas by two correspondents for the Paris l'Express, which quoted a young Dallas woman as saying: "No matter how strongly we hated him, we still cried." Another Texas woman echoed her: "That's right...At the Brook Golf

Results of the content analysis

We have analyzed the content of seven all-Union and six Republic level Soviet newspapers, as well as two Soviet magazines, for the ten-day period following the Kennedy assassination. Approximately 5,000 different stories were coded for ten different article formats and for each of the four themes in the scenario.[6] For reasons analogous to those given in Chapter VI, the coding of themes was limited to fifteen of the thirty-two Soviet print media conceptualized in the simulation, and, from the pattern of theme appearances found in these media we inferred a likely pattern of appearances over the other seventeen media as well. The publication periodicities and assumptions used in making these inferences are outlined in Appendix B (Tables B.8 and B.9).

Table 7.1 summarizes the message schedule obtained by content analyzing all-Union and Republic-level Soviet newspaper editions for

---

Club I told the people who went to see the presidential cortège, 'be sure to take a good aim!' You know we joked a lot then. Now I find that my joke was in bad taste." The article drew the following conclusion: "Perhaps some day a plot will be discovered, but the climate we found in Dallas is just as deadly as any plot. If it was fated that John Fitzgerald Kennedy should be the victim of an attempt on his life, then it is perfectly natural that it should have happened only in Dallas. A psychoanalyst would say that in the dark recesses of its heart Dallas...killed him long ago." Other non-Communist sources quoted in support of this line of argument, in the December 21st issue of Literaturnaya gazeta, were the Hamburg weekly Der Stern and the London weekly Observer.

[6] The print titles used in the content analysis are listed in Appendix B (table B.9), and the article formats coded for the content analysis are identified on the sample press code sheet in Appendix B (Table B.1).

Table 7.1--Content analysis for four themes about the assassination of President Kennedy occurring in the Soviet press, November 22nd-December 1st, 1963.

Themes Coded	DAY										Total No. of Press Occurrences of the Theme
	22	23	24	25	26	27	28	29	30	1	
1. The assassination of President Kennedy	0 0 0	7[a] 8[b] 15[c]	131 84 215	9 9 18	89 86 175	63 60 123	45 34 79	41 36 77	35 28 63	24 22 46	444 367 811
2. The swearing-in of Johnson as President	0 0 0	2 4 6	10 11 21	0 0 0	3 0 3	1 3 4	0 0 0	0 0 0	0 0 0	0 0 0	16 18 34
3. The assassination of Oswald	0 0 0	0 0 0	0 0 0	1 1 2	31 17 48	35 12 47	15 3 18	11 10 21	10 5 15	11 1 12	114 49 163
4. The establishment of the Warren Commission	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	1 0 1	8 13 21	9 13 22
Total No. of Theme Occurrences in the Soviet Press during the Day	0 0 0	9 12 21	141 95 236	10 10 20	123 103 226	99 75 174	60 37 97	52 46 98	46 33 79	43 36 79	583 447 1030

[a]No. of press occurrences found in the content analysis.

[b]Additional no. of press occurrences inferred.

[c]Total no. of press occurrences.

the period after President Kennedy's assassination and then spreading the resulting theme appearances over all thirty-two Soviet print media in the simulation.[7] It shows an estimated total of 1,030 occurrences of the four themes in the thirty-two print media. As we hypothesized, the single most prominent theme was the one entitled "the assassination of President Kennedy" (theme 1). The fact that over four-fifths of the press messages in the scenario relate to this theme reflects the Soviet authorities' undoubted awareness that (1) the domestic population would be intensely interested in news of the assassination and (2) large segments of the population could easily satisfy their curiosity by listening to short-wave radio transmissions from abroad.

Two of the remaining three themes used in the content analysis were covered relatively lightly by the Soviet press. The comparatively small number of mentions of "the swearing-in of Johnson as President" (theme 2) and "the establishment of the Warren Commission" (theme 4) probably reflects the fact that these themes were of a much less dramatic nature than stories about Kennedy's assassination or Oswald's murder. While the latter theme also received significantly greater press coverage than themes 2 and 4, it occurred only about one-fifth as often as articles about the President's assassination.

The results of the content analysis performed for the Kennedy assassination simulation suggest that Soviet print media selectively propagated or deemphasized themes as a function of their salience.

---

[7]For the print titles or types which each of these thirty-two media encompass, see Appendix B (Table B.9).

The content analysis results also indicate that the level of Soviet print media activity was influenced as much by institutional factors as by the actual unfolding of events. On the 22nd there was no print coverage of the President's assassination because it took place after stop-press time. Theme occurrences did begin on the 23rd, however, and they peaked sharply on the 24th, due mainly to Oswald's arrest and to speculations about his alleged left-wing affiliations. On the 25th print coverage dipped markedly because, in line with their regular practice, most Soviet newspapers published no Monday edition. Press activity picked up again on the 26th and remained strong on the 27th, reflecting the heavy print coverage of Oswald's murder, conjecture about its implications, and Kennedy's funeral. Finally, as in the Cuban crisis scenario, the daily number of Kennedy assassination theme occurrences gradually declined as the dramatic impact of the tragedy subsided.[8]

Soviet radio and television coverage

President Kennedy's assassination and the subsequent related events dominated Soviet radio commentary over the weekend and throughout

---

[8] In the content analysis of the Soviet press for Kennedy assassination themes, the same person coded all stories in every issue of the fifteen publications. Having no reason to doubt the coder's consistency, we believe the reliability of the results was relatively high. Supporting the validity of the content analysis are the same set of reasons set forth in the preceding Chapter.

the following days to an extent rarely achieved by non-Communist world events.[9] Moscow radio gave flash treatment to the early reports of the President's assassination and continued to present comment and reportage throughout the days which followed.[10] The initial reaction was one of shocked disbelief and regret. Praise of the assassinated President was fervent and pervasive, and expressions of condolence reported the sentiments of world leaders and the world public. Soviet radio commentators lamented President Kennedy's death, praising his foreign and domestic policies and particularly his efforts to achieve an East-West detente. From the beginning, however, Moscow interspersed praise of the dead president with references to the "extreme rightwing elements" alleged to have been responsible for his assassination.

It was sometime after 10:00 p.m. Moscow Central Time on Friday evening, November 22nd, when Moscow Radio's Domestic Service interrupted its programs with a brief, solemn announcement of "the sad

---

[9]For a description of Soviet radio and television reportage on the assassination of President Kennedy we have relied on the F.B.I.S. Daily Report, Nos. 229-32; C.M., "Kennedy Assassination--Communist Version"; Dunning, "The Kennedy Assassination as Viewed by Communist Media"; the conversation with Finkelstein.

[10]It was early evening of November 22nd, Central European (Warsaw-Prague-Budapest) Time, when the news was flashed that President Kennedy had died, the victim of an assassin's bullet. Radio Free Europe records show that the news reached Munich at 7:44 p.m., Central European Time, and went on the air to Eastern Europe over RFE's transmitter forty seconds later. The first Communist orbit broadcaster to act was Radio Moscow: some forty minutes afterward (10:24, Moscow Central Time) it interrupted its programs with a brief, solemn announcement (Dunning, "The Kennedy Assassination," p. 164).

news just learned from New York" that President Kennedy had "died in a hospital...victim of an attack, it is supposed, by ultra-right elements." The Soviets, of course, were not alone in making this guess, but since it fit what seemed likely to be their most rewarding line, they made it with bold assurance. By early the next morning Radio Moscow was broadcasting a categorical assertion by the U.S. Communist Party: "The murder is the result of the criminal work of pro-fascist ultra-rightist forces which do not stop at undermining the democratic institutions of the country, threatening international peace and turning back the wheel of history."

On Sunday, November 24th, in an International Observers Roundtable (beginning at 16:20 Moscow Central Time), Moscow Radio's Domestic Service discussed the impact and the significance of President Kennedy's assassination. The chairman of the panel, Viktor Osipovish Shragin, expressed "sorrow", "revulsion", "indignation", and "outrage" as well as "grief together with the U.S. people," and observed that President Kennedy's death was not only a great loss in international affairs; no less important were the measures carried out by "Kennedy...within his own country which immediately evoked strong resistance from the most reactionary forces and racist elements."

Another noted Soviet journalist and member of this roundtable, Vikenty Aleksandrovich Matveyev, pointed out that the late President had duly recognized "the changed circumstances of the 'sixties...the growth in the might of the socialist world, "and the shift in the balance of power within the international arena in favor of the latter." Matveyev went on to describe Kennedy as "one of those sober political figures who understood that former methods of U.S. policy had become antiquated. He understood that in the atmosphere of nuclear weapons stockpiling and the danger of nuclear war, the only realistic way to settle international problems at issue was peaceful talks. It is of this that Kennedy's breadth of vision consisted. Naturally, he took his stand on positions that defended his class and his capitalist system and he was our idealogical opponent." But, it was added: "... the peace-loving policy of the Soviet Union, the growth in the might of our country, compelled Kennedy to retreat from traditional canons and to take into consideration the enormous international authority of the Soviet Union."

Refuting a statement in the Washington Post that "no political positions or disagreements" as paraphrased by Matveyev, could have laid the foundation for the President's assassination, the same speaker said: "Such a statement is nothing but an attempt to distract the attention of the U.S. public from the real causes of the President's murder....In the United States there are influential groups of politicians whose backers are the big monopolies, especially those connected with the production of arms and oil interests abroad, who have spoken out as violent defenders of the old, outworn line of the dead Dulles and his policy of...brinkmanship. The more distant this course came to be from the change in the balance of power in the international arena, the more frantic became the defenders of the old course...the rabid ones. They spoke out violently against the course of coexistence with the Soviet Union, fought for a furious arms race, demanded intervention in Cuba. These were the people represented by Senators like Barry Goldwater, who voted in the Senate against the Moscow Treaty for a partial ban on nuclear weapons tests.

"Their wild stubbornness in foreign policy was matched by their line in domestic policy," Matveyev continued. "It was they who, foaming at the mouth, opposed the solution of the Negro problem in the spirit of the twentieth century...became demoniacally enraged at the mention of progress. In such circumstances...it is not difficult...to resort to shooting...someone like Kennedy, who understood that the policy of the rabid ones was leading the United States to catastrophe."

Other speakers at the roundtable recalled the assassination of other Presidents: "in 1856 [sic] Abraham Lincoln; in 1881, Garfield; McKinley in 1901;" and cited Jean-Paul Sartre as authority "that the murder shows the fanaticism to which the racial struggle in the United States leads." Matveyev, when his turn came again, stated: "it was far from fortuitous that this foul murder took place in Dallas. In that city as far back as the thirties the most extreme fascist circles had made a nest for themselves and furiously opposed the then President of the United States, Franklin Roosevelt."

Generously financed by Texas oil millionaires, "the American extremists became especially active in 1961, when President Kennedy came to power." One of these "oil kings", Matveyev said, "admitted openly in 1962 that he subsidized the activities of the fascist groups to the tune of one million dollars per year," citing Fred Cook (a writer for the weekly The Nation) concerning the "fraternal alliance of the fanatics and part of the most important corporations in America."

The foregoing line of thought continued, with variations and some additions, in all the Soviet mass media throughout the month following the President's assassination. With regard to the administration of President Johnson, the general assessment from Soviet radio commentators was that little immediate change in American foreign policy could be expected, but that the new President was in many respects untried in the international field and that no present judgement was possible. Cautious Moscow comments indicated hope that President Kennedy's "peaceful coexistence policy" would be continued.

The arrest of Lee Harvey Oswald and indications that he had been associated with Communist causes occasioned a major problem for Soviet propagandists. Their first recourse was surprisingly weak, but traditional: they simply suppressed the facts. It was not until midafternoon Saturday before Radio Moscow mentioned Oswald's name, and it was early evening before TASS broke the news that Oswald allegedly had past Communist connections. The manner in which TASS introduced this news was as follows: "American news agencies and television stations have broadcast reports based on statements by Dallas police officials who make only one thing clear: they are attempting to link the Communist Party with the murder of the President."

To a Western observer this distortion is all the more incredible because it did not take place in a vacuum. Voice of America, the British Broadcasting Corporation, Radio Liberty and other Western stations had sizeable audiences within the USSR during this period. Between the extra attention which was undoubtedly paid to Western radio during the aftermath of the President's assassination, and word-of-mouth relaying of the news, there can hardly have been a significant proportion of the Soviet population who did not very quickly hear non-Communist versions of the events.

Eventually, however, Soviet media succumbed to the necessity of taking note of reports on Oswald's efforts for "Fair Play for Cuba" and his past residence in the Soviet Union. Their handling of this news was rather ingenious. Radio Moscow's star commentator Valentin Zorin said: "For hours on end, certain American propaganda organs have been asserting that Oswald is allegedly a Communist and has some connection with the organization for a sensible policy toward Cuba." Zorin then countered this allegation with a report that the U.S. Communist Party had repudiated Oswald and condemned the crime, and that it had pointed out "...the generally known truth that no person preaching or practicing terror or violence can be a member of the Communist Party."

Before Ruby's attack on Oswald Soviet commentators had agreed upon the following line: Oswald might be the killer, but any connection of him or his deed with Communism could only be a lie and a "provocation;" somehow, the killing had to be a reactionary plot. The murder of President Kennedy's assassin raised new issues. Moscow radio was temporarily cautious, asking why Oswald's transfer was advertised, how Ruby was admitted to the scene, what his motives might have been, and so on.

Soviet radio commentators were hardly alone in asking these questions: Americans were asking the same questions and more. The difference was in the assurance with which Russian propagandists immediately and confidently supplied the answers. There began a steady buildup of purported fact and comment on Texas: the state was pictured as a nest of lawlessness, gangsterism, rapacious oil millionaires, and a center of the John Birch movement. The earlier attack on U.N. Ambassador Adlai Stevenson and a variety of threats against President Kennedy were recalled. The charge that "extreme rightwing elements" had been responsible for President Kennedy's assassination was accentuated in the wake of Oswald's murder, which was said to have been perpetrated by "the same people" who assassinated the President. Soviet radio commentators concluded that Ruby was hired by these reactionaries to silence Oswald before he could prove that he wasn't really a Communist. The Dallas authorities' earlier statements about Oswald and his murder were claimed to reflect an attempt to hide the fact that reactionaries incited and engineered the President's death as well as an attempt to turn the world's indignation against the Communists and to fan a hysterical, anti-Communist, anti-Soviet, anti-Cuban campaign.

On Tuesday, November 26th, prominently and widely reporting President Johnson's messages to Khrushchev and other heads of state, Moscow radio emphasized the new President's expressed determination "to continue John Kennedy's efforts to dispel East-West tensions and lessen the danger of a nuclear war." A Moscow commentator observed that President Johnson's emphasis on the peaceful solution of disputed problems "can only be welcomed" and was of "particular importance" after President Kennedy's assassination, when "the most reactionary and aggressive circles of the United States at once sought to use this crime to exacerbate international tensions." The commentator pointed out that the USSR was not removing from its agenda proposals for a nonaggression pact, the prevention of surprise attacks, and the reduction of military budgets. The Soviet people heard President Johnson's statement "with satisfaction," Soviet commentator Zorin told Moscow radio's domestic audience.

TASS reports on the activities of Anastas Mikoyan noted the Soviet First Deputy Premier's comment that he was "highly satisfied" with his meeting with President Johnson, and his remark that "we have found ways for the continuation of disarmament negotiations." TASS also reported Mikoyan's exchange with newsmen concerning a possible Johnson-Khrushchev meeting.

On the 26th Moscow commentators continued to express the belief that the shooting of the late President and of the alleged assassin Oswald were the work of rightist forces, which "abhor international relaxation and are pressing for world nuclear conflict." In connection with the investigation of the assassination, domestic service listeners were told: "The fact that the Dallas tragedy places a stain of shame on the much-vaunted American democracy worries even the bourgeois press." Moscow radio impugned the Dallas police handling of the Oswald case, which they said raised serious doubts about Oswald's guilt.

Having carefully constructed a role for Oswald as the dupe of a reactionary plot, Soviet propagandists, in somewhat of a reversal, began on the 27th to write Oswald out of that plot. Citing the opinions of Austrian and Italian rifle experts which had been reported in the Western press, Moscow commentators contended that it would have taken two men to fire three bullets so quickly. Then they began to question whether either of this hypothetical pair was Oswald. Moscow sources continued to circulate extensive reports of conflicting and "suspicious" evidence regarding the assassination of the President as "proof" that the rightwing origins of the affair were yet to be revealed.

Also on November 27th, and again on the 28th, President Johnson's speech to a joint session of Congress was widely reported in factual, summary form by the Moscow radio and TASS. A Moscow commentator, noting the new President's expressed intention to implement President

Kennedy's ideas and ideals "in a constructive way," said that if the new President referred to Kennedy's efforts "toward strengthening peace and solving disputed problems through peaceful means, this statement is of course worthy of appreciation." He added that the USSR "heartily desires" that "honest friendship triumph in relations between all countries." Moscow radio's Tuchnin told the home audience that Johnson had again confirmed that he would continue Kennedy's policies. Scattered Moscow commentaries warned of the spirit of hatred and violence in the United States encouraged by the forces of the extreme right, and voiced hope that President Johnson would resist pressure from the supporters of the cold war.

Finally, on the 28th, TASS cited a Christian Science Monitor Washington correspondent's observations that perhaps the major question in Washington then was "when and where the President would meet Soviet Premier Khrushchev." TASS said that while many believed a summit meeting would be "an unwise step until the new President has had more time to become accustomed to his role," some felt that "sooner or later President Johnson would have to meet the Soviet Premier informally, if only to establish personal contact."

Friday, November 29th, brought another distinct turn in the Soviet propagandists' line. A week after the Dallas tragedy there was "evidence" that Oswald had in fact been a rightist and even an anti-Communist U.S. intelligence agent. Moscow radio carried Soviet press reports of a statement by the stenographer who worked on Oswald's manuscript about the USSR, including her impression that he was an American spy. Moscow commentators said this new material "completely exposed the lies and fabrications of the reactionaries who said he was a Communist." Moscow radio also continued to circulate reports, mainly from the Western press, casting doubt on the Dallas police version of Lee Harvey Oswald's role in the assassination of President Kennedy and his reported Communist sympathies. Soviet sources maintained that the U.S. and Western public did not believe that Oswald was solely responsible for the assassination or that he was inspired by Communism.

Also on November 29th, and again on the 30th, scattered and brief Moscow radio comments on the President's address to Congress generally continued to express satisfaction that he indicated he would continue the policy of seeking international agreement and understanding.

Moscow television began to report President Kennedy's assassination and its aftermath on Saturday, November 23rd. Twice that day there were telecasts of visits of Khrushchev and Gromyko to the residence of Ambassador Foy Kohler, showing the two Soviet officials signing the visitors' book under President Kennedy's portrait and observing a minute of silence with solemn faces. Over American Telephone and Telegraph Company's Telestar satellite, Moscow television saw a video recording of President Kennedy's funeral cortège, saw his flag-draped casket lying in state, and his family and friends paying their last respects.

Again and again Moscow television featured Soviet commentaries on the late President's peace efforts, his espousal of "peaceful co-existence," and his dedication to the "consolidation of Soviet-American cooperation." In a special broadcast Moscow television showed him signing the partial nuclear test-ban treaty. This treaty was invariably referred to as the "Moscow Treaty" and the claim was constantly made that it was a product of Soviet initiative, completely ignoring the fact that in substance it was originally proposed under the Eisenhower administration in 1958. Moscow television also featured two documentaries supplied by the American embassy: President Kennedy's inaugural and his speech at the American University in Washington, D.C., June 10, 1963, described by the Soviet television announcer as given at "Washington University" and extolled as in the spirit of the doctrine of "peaceful coexistence," though not always consistently so.

Moscow television audiences were also able to view, live on the 24th, the assassination of Lee Harvey Oswald by Jack Ruby. After seeing this dramatic event with their own eyes, the contours of a premeditated plot must have seemed perfectly clear to a large segment of the Soviet population. By and large, Soviet television coverage of the President's assassination and the events which followed it closely paralleled domestic press and radio reportage.

Results of the content analysis

We have content analyzed a sample of the material transmitted over the Moscow domestic service during the ten-day period following the assassination of President Kennedy. Approximately thirty different broadcasts were coded for six different times of day and for each of the four themes in the scenario.[11] For reasons outlined in the previous chapter, the coding of themes was limited to broadcasts carried by the Moscow domestic service and to only a small sample of the total material disseminated by this source after the assassination. From the pattern of theme appearances found in the Moscow domestic service broadcasts we inferred a likely pattern of appearances over the ten radio media in the simulation. We also used the results of the radio content analysis to infer a likely pattern of theme appearances over the four television media in the simulation. The radio and television broadcast schedules, as well as the assumptions used in making these inferences, are included in Appendix B (Tables B.11-B.14).

Tables 7.2 and 7.3 summarize the message schedules obtained by content analyzing Moscow domestic service broadcasts and spreading the resulting theme occurrences over all fourteen Soviet electronic media in the simulation. They show estimated totals of 736 occurrences

[11]The times of day coded for the content analysis of Soviet radio broadcasts, and for the content inference of Soviet television broadcasts, appear on sample code sheets in Appendix B (Tables B.2 and B.3).

Table 7.2--Content analysis for four themes about the assassination of President Kennedy occurring on Soviet radio, November 22nd-December 1st, 1963.

Themes Coded	DAY										Total No. of Radio Occurrences of the Theme
	22	23	24	25	26	27	28	29	30	1	
1. The assassination of President Kennedy	3[a] 75[b] 78[c]	7 53 60	4 76 80	2 56 58	1 25 26	1 17 18	1 15 16	0 0 0	2 50 52	1 7 8	22 374 396
2. The swearing-in of Johnson as President	1 26 27	4 33 37	1 19 20	1 33 34	1 23 24	1 33 34	1 33 34	0 0 0	1 31 32	1 7 8	12 238 250
3. The assassination of Oswald	0 0 0	0 0 0	0 0 0	1 23 24	0 2[d] 2	1 15 16	0 0 0	0 0 0	1 19 20	1 7 8	4 66 70
4. The establishment of the Warren Commission	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	1 19 20	0 0 0	1 19 20
Total No. of Theme Occurrences on Soviet Radio during the Day	4 101 105	11 86 97	5 95 100	4 112 116	2 50 52	3 65 68	2 48 50	0 0 0	5 119 124	3 21 24	39 697 736

[a] No. of radio occurrences found in the content analysis.

[b] Additional no. of radio occurrences inferred.

[c] Total no. of radio occurrences.

[d] In the inferential procedure used it sometimes happened that a message occurrence found in the content analysis on day n implied one or more message occurrences on day n+1.

Table 7.3--Inferred pattern of television appearances for four themes about the assassination of President Kennedy occurring on Soviet radio, November 22nd-December 1st, 1963.

Themes Coded	DAY 22	23	24	25	26	27	28	29	30	1	Total No. of Television Occurrences of the Theme
1. The assassination of President Kennedy	3[a] 3[b] 6[c]	7 178 185	4 80 84	2 47 49	1 36 37	1 46 47	1 25 26	0 3[d] 3	2 11 13	1 33 34	22 462 484
2. The swearing-in of Johnson as President	1 1 2	4 81 85	1 16 17	1 33 34	1 13 14	1 34 35	1 25 26	0 15[d] 15	1 10 11	1 19 20	12 247 259
3. The assassination of Oswald	0 0 0	0 0 0	0 0 0	1 1 2	0 23[d] 23	1 22 23	0 3[d] 3	0 0 0	1 1 2	1 24 25	4 74 78
4. The establishment of the Warren Commission	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	1 1 2	0 14[d] 14	1 15 16
Total No. of Theme Occurrences on Soviet Radio during the Day	4 4 8	11 259 270	5 96 101	4 81 85	2 72 74	3 102 105	2 53 55	0 18[d] 18	5 23 28	3 90 93	39 798 837

[a]No. of radio occurrences found in the content analysis.

[b]Additional no. of television occurrences inferred.

[c]Total no. of television occurrences.

[d]In the inferential procedure used it sometimes happened that a message occurrence found in the content analysis on day n implied one or more message occurrences on day n+1.

of the four themes in the ten radio media and 837 occurrences of the four themes in the four television media.[12] Two features of the resulting radio and television message schedules are worth noting.

First, the message schedules obtained for Soviet electronic media closely resemble the schedule obtained for the domestic press (Table 7.1) in regard to the relative frequency of each tehem's appearance over the ten-day period. In each case "the assassination of President Kennedy" (theme 1) and "the establishment of the Warren Commission" (theme 4) are the themes that occur with the most and least frequencies respectively. Each message schedule shows "the swearing-in-of Johnson as President" (theme 2) and "the assassination of Oswald" (theme 3) as the two themes receiving an intermediate level of coverage, with the rank-ordering of their frequencies of occurrence reversed between print and electronic media.

As in the case of the Cuban crisis simulation, electronic message schedules for the Kennedy assassination scenario were constructed from a much sparser data base than the print message schedules, and a different definition of individual message occurrences was used for each of these media types.[13] Thus, the ordinal similarity

---

[12]For the portions of the day which each of these fourteen media span, see Appendix B (Tables B.12 and B.14).

[13]In addition, content analyses for the print and electronic message schedules were coded by two different persons. Observations similar to those made regarding the reliability and validity of the content analyzed press material (n. , p.) apply to the content analyzed radio material as well.

in theme emphasis between Soviet print and electronic message schedules synthesized for the Kennedy assassination scenario suggests that these media must have covered the assassination with a substantial degree of uniformity and coordination.

Foreign radio coverage

Overview

For reasons explained in the preceding chapter we do not have sufficient source data to describe coverage of the Kennedy assassination and its aftermath by the BBC and Radio Liberty in their broadcasts to the USSR. But transcripts of Voice of America broadcasts obtained from the USIA do enable us to describe this station's coverage.

Beginning on November 22nd at 11:00 p.m. Moscow Central Time (only one and one-half hours after news of President Kennedy's death had been made public), and continuing for the next several days, virtually every Voice of America broadcast beamed to the USSR was devoted to news about the assassination of President Kennedy and related events. Up to this period VOA had been broadcasting seven hours a day to the Soviet Union, but on the day after the President's assassination the station added one special half-hour broadcast to its regular schedule, and on each succeeding day through December 1st, anywhere from two to four special half-hour broadcasts were added to the normal VOA programming.[14]

During the late evening of November 22nd VOA's Russian-language programs included flash bulletins giving the latest news about President Kennedy's assassination. There were no Georgian, Ukrainian, or Armenian broadcasts on the assassination during this period. On November 23rd VOA's Ukrainian broadcasts included the report of Kennedy's death and Johnson's swearing-in, a roundup of domestic U.S. reaction--including statements by Goldwater, Rockefeller, Mansfield, Truman, Eisenhower, Stevenson, and a number of Republican Senators, a review of reactions to the tragedy in Britain, France, Italy, the Vatican, West Germany, Norway, the Netherlands, Belgium, Spain, Sweden, the USSR, Greece, Algeria, Egypt, Turkey, Ghana, and Latin America, biographies of Kennedy and Johnson, a report on President Johnson's airport statement and his activities during his first day in office, a roundup of reactions in Portugal, Finland, the Philippines, Japan, Pakistan, India, and the USSR, a review of President Kennedy's book "Profiles in Courage", and a news analysis entitled "Continuity of the American Presidency."

VOA's Georgian and Armenian broadcasts on the 23rd included an account of the assassination, biographies of Kennedy and Johnson, a review of U.S. and world reaction, and a news analysis entitled "Mr. Kennedy's Death: Its Meaning to the Nation."

---

[14]For the scheduling of these additional broadcasts see Appendix B (Table B.16).

Russian-language broadcasts carried by VOA on the 23rd included continuing announcements of President Kennedy's death, a report on Johnson's airport statement, a roundup of U.S. and world reaction, biographies of Kennedy and Johnson, an account of the memorial service to be held at a Russian Orthodox Church, reports on Oswald's arrest and accusation, an account of President Johnson's activities--including his conferences with top aides, and a report that President Johnson had designated November 25th a national day of mourning.

On Sunday, November 24th, VOA's Georgian, Armenian, and Ukrainian broadcasts included a report on funeral arrangements for President Kennedy, an account of President Johnson's activities and his proclamation of a national day of mourning, and a report on the arrival of world leaders in Washington for Kennedy's funeral. In addition, Georgian broadcasts included a rebroadcast of the news analysis entitled "the continuity of the American Presidency," a correspondent's assessment of the likely impact of Kennedy's death on the U.N., and a roundup of European reaction to the tragedy. Armenian and Ukrainian broadcasts included a special feature entitled "John Fitzgerald Kennedy, the Man and the President" and roundups of U.S. and world reaction. Ukrainian broadcasts also included a report on the latest statement by Dallas police regarding the investigation and a news analysis entitled "Mr. Kennedy's Death: Its Meaning to the Nation."

VOA's Russian-language broadcasts on the 24th included an account of the Kennedy funeral arrangements, a report on President

Johnson's first cabinet meeting and his proclamation of a national day of mourning, a report on various mourning activities in the U.S. and on the world dignitaries who were arriving in Washington for the funeral, an account of Oswald's arrest and of his being charged with the murder, a eulogy of President Kennedy by Archbishop John of San Francisco, a review of foreign press comment, a rebroadcast of the special feature entitled "Profiles in Courage", an account of the orderly transition of U.S. governmental power, a report of the Dallas police claim that they had enough evidence to convict Oswald, a special feature entitled "America's Religious Leaders and the Death of President Kennedy," a report that Lee Harvey Oswald was in critical condition as the result of being shot by Jack Ruby (first broadcast at 10:00 p.m. Moscow Central Time), a report listing the world leaders to be present at Kennedy's funeral, an account of the requiem masses to be held at Saint Patrick's Cathedral and the Russian Orthodox Church of Saint Nicholas, and a report that Oswald had died after being shot by Jack Ruby (first broadcast at midnight, Moscow Central Time).

On Monday, November 25th, VOA's Georgian broadcasts included a report on the crowds which had filed past Kennedy's coffin in the Capital rotunda and on the eulogies delivered there by Warren, Mansfield, and MacCormack, a report on the foreign dignitaries who had arrived in the U.S. for the funeral, a review of President Johnson's activities, the report that Oswald had been shot, and a rebroadcast of the special feature "John Fitzgerald Kennedy--the

Man and the President." Armenian and Ukrainian broadcasts included a review of activities in the Capital rotunda, a report on preparations for the funeral, and a special feature entitled "A Country in Mourning." Ukrainian broadcasts on the 25th also included a review of President Johnson's activities, a report that Mrs. Kennedy would greet dignitaries in the White House, a roundup of tributes to Kennedy from Latin America, Iran, Jordan, Sierra Leone, Kenya, Cyprus, Warsaw, Singapore, Addis Ababa, Paris, and the Vatican, a report that Oswald had died, and a news analysis entitled "Kennedy, Johnson, and U.S.-Soviet Relations."

VOA's Russian-language broadcasts on the 25th included a report on the crowds filing past Kennedy's coffin, an account of the arrival of heads of state in Washington for Kennedy's funeral, a roundup of reaction in European and Asiatic countries, a rebroadcast of the special feature "John Fitzgerald Kennedy--the Man and the President," a report that the requiem mass for Kennedy would be read by Cardinal Cushing, a review of the memorial services that were being held for Kennedy in various parts of the world, an account of the funeral procession and the church and graveside services to be held for President Kennedy, a report on the condolences from Nina Khrushchev, a report that the NATO Permanent Council had called for a special meeting to pay tribute to the late President, an account of President Johnson's letters to Kennedy's children, a review of Richard Nixon's comments on Oswald's death, a report on Cardinal Ritter's remarks about the assassination of President Kennedy, a report that the largest television link-up in European history would bring scenes of the President's funeral to the USSR, and detailed reportage on the funeral procession and the laying-to-rest ceremony--including requiem music, drums, the church service, and the Arlington Cemetary burial.

On Tuesday, November 26th, VOA's Ukranian broadcasts included a program devoted to President Kennedy's funeral, a review of President Johnson's activities on Monday and Tuesday and a report that he would address Congress on Wednesday, a TASS report on LBJ's message to Khrushchev, an account of the U.N. General Assembly session in memory of JFK, and news analyses entitled "The Compounding of National Tragedy" and "The New President." Georgian broadcasts carried by VOA on the 26th included detailed reportage of the Kennedy funeral, a report on Johnson's meetings with world leaders, his message to Khrushchev, and his intention to address Congress on Wednesday, and special features entitled "The Requiem Mass" and "Burial at Arlington." Armenian broadcasts included a review of President Johnson's activities the day of the funeral, detailed reportage on the funeral, a rebroadcast of the news analysis entitled "The Continuity of the American Presidency," and a special, feature entitled "Lyndon Baines Johnson."

VOA's Russian-language broadcasts on the 26th included a report on the mourning day in Washington, accounts of President Johnson's messages to leaders of sixty countries, an account of the reception for world dignitaries held at the State Department, a report on the expression of condolences from the U.S. Congress to Mrs. Kennedy, an account of the U.N. General Assembly's special memorial session, a report that the investigation in Dallas would be continued, reportage on the funeral procession and graveside ceremony, a report on President Johnson's message to the U.S. armed forces and on his planned address to Congress, a report that the bodies of Patrolman Tippit and Oswald had been buried the previous day, accounts of tributes to the memory of JFK from American artists and from various foreign countries, a rebroadcast of the news analysis "The Compounding of National Tragedy" and the special feature "Lyndon B. Johnson", an account of President Johnson's statements on U.S. policies and his meeting with the governors, a news analysis entitled "Kennedy, Johnson and U.S.-Soviet Relations," a report that President Johnson would continue to pursue the objectives of President Kennedy's administration, a report that leading world figures were returning home, and a news analysis entitled "Presidents Kennedy and Johnson and the Nuclear Test Ban Treaty."

On Wednesday, November 27th, VOA's Georgian and Armenian broadcasts included a report that President Johnson would be addressing a joint session of Congress that day, an account of Stevenson's tribute to Kennedy in the U.N., a report that thousands of persons were visiting Kennedy's grave and that mourning for the late President was continuing all over the world, a report that Ruby had been charged with Oswald's murder and that an investigation of both assassinations was continuing, and a news analysis entitled "The New

President in Action." Georgian broadcasts also included a rebroadcast of the news analysis entitled "The Compounding of National Tragedy," and Armenian broadcasts included a report that President Johnson would meet with leaders of Britain, West Germany, and France early the following year, an account of Johnson's meeting with Mikoyan, and a special feature entitled "How does the American Government Work?" In addition to most of the foregoing programs, VOA's Ukrainian broadcasts on the 27th included news analyses and special features entitled, respectively, "Continuity Without Confusion," "Another Profile of Courage" (Mrs. Kennedy), "The Feeling of Humanity" (Europe), and "The 36th President."

Russian-language broadcasts carried by VOA on the 27th included a recap of President Johnson's meetings with foreign representatives, a report that expressions of support for President Johnson were continuing, a report that a Grand Jury in Dallas had charged Jack Ruby with the murder of Oswald, an account of tributes to Kennedy in the U.N. General Assembly and in various European capitals, news analyses entitled "President Johnson and U.S. Foreign Policy," "Another Profile in Courage," "The New President," "Continuity Without Confusion," and "President Johnson and the Far East," A European correspondent's report entitled "Europe Views J.F.K.'s Funeral," a report on the continuing investigation of President Kennedy's assassination, and an account of President Johnson's address to Congress.

On Thursday, November 28th, VOA's Georgian, Armenian, and Ukrainian broadcasts included a report on the new President's speech to Congress and the reaction of U Thant and others to the speech, a report that Mrs. Kennedy would be moving from the White House, an account of an interview with Governor Connally and his remarks on the Kennedy assassination, a program describing the sad Thanksgiving in the U.S., and a report that a Kennedy cultural memorial had been suggested. VOA Russian-language broadcasts on the 28th included a report on President Johnson's address and reaction to it in Congress and around the world, a rebroadcast of the special feature "The 36th President," a report that Mrs. Kennedy would be moving into Averill Harriman's home, an account of Governor Connally's remarks about President Kennedy's assassination, a report that a bill had been introduced in Congress to name a cultural center for President Kennedy, a reading of Kennedy's Thanksgiving Day proclamation, a report that a Peiping delegate had denounced President Kennedy, an account of how John Jr. had saluted his father, a report on the Kennedy family gathering at Hyannisport, and an account of American artists' tribute to the late President.

On Friday, October 29th, VOA's Georgian, Armenian, and Ukrainian broadcasts included a report on President Johnson's Thanksgiving message, a roundup of reactions to the President's address to Congress, a program about the slain policeman's (Tippit's) family, and a news analysis entitled "Time for Effective Action." Georgian and Ukrainian broadcasts also included accounts of how the Johnson's and the

Kennedy's were spending Thanksgiving, and the American and Ukrainian broadcasts included a report on how the Chinese Communist delegates to the Warsaw conference had attempted to block a tribute paid to Kennedy. Each of the three nationality language broadcasts included special features entitled, respectively, "West Europe Watches Transition," "East Europe Welcomes Speech," and "U.S. Press on This Year's Thanksgiving Day."

VOA's Russian-language broadcasts on the 29th included an account of President Johnson's Thanksgiving speech, a report on the new President's conferences with top advisers, a report on the pilgrimage to Kennedy's grave, a roundup of reaction abroad to President Johnson's address, a program about the slain policeman's family, an account of the tributes that were being paid to President Kennedy all over the world and, a review of American economic development during the previous three years.

On Saturday, November 30th, VOA's Georgian, Armenian and Ukrainian broadcasts included a report that President Johnson had named a special Commission--headed by Chief Justice Warren--to conduct a full investigation of President Kennedy's assassination, accounts of continuing world-wide tributes to President Kennedy, and a special feature entitled "U.S. Government Thanks for Soviet Expressions of Sympathy." In addition, Georgian broadcasts included a report on the crowds visiting Kennedy's grave and a special feature entitled "A Reason for Thanks." Armenian broadcasts also included a news analysis entitled "The U.S. & Self-Determination," a roundup of

European editorial reaction to President Johnson's speech, and a report that Asian nations had been reassured by the speech. Ukrainian broadcasts included a review of the week's events.

VOA Russian-language broadcasts on the 30th included a report on President Johnson's establishment of the Warren Commission, a review of the new President's activities for the day, accounts of continuing tributes to President Kennedy's memory from around the world, a report on the U.S. government's official message of thanks for Soviet condolences, a roundup of American and foreign press reactions to President Johnson's address to Congress, and a review of President Kennedy's achievements and the tasks facing LBJ.

On Sunday, December 1st, VOA's Georgian broadcasts included a report on President Johnson's schedule of activities for the day, an announcement that the Soviet embassy had turned over Russian files on Oswald to the U.S. State Department, an account of Dean Rusk's thanks to Moscow for their expressions of sympathy, a review of the week's events, a rebroadcast of the special feature "Profile in Courage," and a special religious feature entitled "John F. Kennedy." In addition to many of these programs VOA's Armenian broadcasts included a report on the continuing investigation of President Kennedy's assassination, and Ukrainian broadcasts included a rebroadcast of the news analysis entitled "President Johnson's Foreign Policy."

Russian-language broadcasts carried by VOA on the 1st included a report that the Soviet embassy had given Oswald's files to the U.S. State Department, an account of the pilgrimage to Kennedy's grave, the news analysis entitled "President Johnson's Foreign Policy," a review of President Johnson's schedule for Sunday and Monday, accounts of world-wide tributes to the memory of President Kennedy, and, lastly, a news analysis entitled "Kennedy as a Man in History."

Results of the content analysis

We have content analyzed transcripts of the material broadcast by Voice of America and Radio Liberty during the first ten days after President Kennedy's assassination. As a surrogate for British Broadcasting Corporation broadcasts we also content analyzed issues of the London Times published during this period. Approximately 1,000 foreign radio broadcasts and a similar number of newspaper articles were coded for each of the four themes referred to earlier. VOA and Radio Liberty broadcasts were also coded for their language or target area and the hour of day during which they occurred. From the thematic treatment of the Kennedy assassination in the material content analyzed we were able to infer a likely pattern of theme appearances over all broadcasts beamed to the USSR by VOA, Radio Liberty, and the BBC during this period. The broadcast schedules and assumptions used in making these inferences are included in Appendix B (Tables B.16-B.19, B.21, and B.22).

Tables 7.4-7.6 summarize the message schedules obtained by spreading theme appearances in the content analyzed material over all nine foreign radio media in the simulation. For the four themes they

Table 7.4.--Content Analysis for four themes about the assassination of President Kennedy occurring on Voice of America broadcasts to the Soviet Union, November 22nd-December 1st, 1963.

Themes Coded	DAY										Total No. of VOA Occurrences of the Theme
	22	23	24	25	26	27	28	29	30	1	
1. The assassination of President Kennedy	3[a] 0[b] 3[c]	66 0 66	86 0 86	92 0 92	71 0 71	32 0 32	32 0 32	27 0 27	24 0 24	14 0 14	447 0 447
2. The swearing in of Johnson as President	0 0 0	26 0 26	27 0 27	8 0 8	41 0 41	34 0 34	44 0 44	30 0 30	27 0 27	18 0 18	225 0 255
3. The assassination of Oswald	0 0 0	0 0 0	3 0 3	4 0 4	8 0 8	10 0 10	0 0 0	4 0 4	0 0 0	12 0 12	41 0 41
4. The establishment of the Warren Commission	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	10 0 10	1 0 1	11 0 11
Total No. of Theme Occurrences on VOA during the Day	3 0 3	92 0 92	116 0 116	104 0 104	120 0 120	76 0 76	76 0 76	61 0 61	61 0 61	45 0 45	754 0 754

[a]No. of VOA occurrences found in the content analysis.

[b]Additional no. of VOA occurrences inferred. This is always zero because we were able to obtain copies of all the relevant news scripts for the period.

[c]Total no. of VOA occurrences.

Table 7.5--Inferred pattern of British Broadcasting Corporation occurrences of four themes about the assassination of President Kennedy appearing in the London Times, November 22nd-December 1st, 1963.

Themes Coded	DAY										Total No. of BBC Occurrences of the Theme
	22	23	24	25	26	27	28	29	30	1	
1. The assassination of President Kennedy	0[a] 12[b] 12[c]	7 42 49	14 84 98	21 126 147	13 78 91	5 30 35	4 24 28	3 18 21	1 6 7	1 6 7	69 426 495
2. The swearing-in of Johnson as President	0 12 12	3 18 21	3 18 21	3 18 21	2 12 14	3 18 21	4 24 28	2 12 14	1 6 7	1 6 7	22 144 166
3. The assassination of Oswald	0 0 0	0 0 0	1 6 7	1 6 7	1 6 7	1 6 7	0 0 0	1 6 7	0 0 0	0 0 0	5 30 35
4. The establishment of the Warren Commission	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	2 12 14	1 6 7	3 18 21
Total No. of Theme Occurrences on BBC during the Day	0 24 24	10 60 70	18 108 126	25 150 175	16 96 112	9 54 63	8 48 56	6 36 42	4 24 28	3 18 21	99 618 717

[a]No. of London Times occurrences found in the content analysis.

[b]Additional no. of BBC occurrences inferred.

[c]Total no. of BBC occurrences.

Table 7.6--Content analysis for four themes about the assassination of President Kennedy occurring on Radio Liberty broadcasts to the Soviet Union, November 22nd-December 1st, 1963.

Themes Coded	DAY 22	23	24	25	26	27	28	29	30	1	Total No. of RL Occurrences of the Theme
1. The assassination of President Kennedy	4[a] 56[b] 60[c]	10 307 317	8 322 330	20 495 515	6 582 588	5 511 516	4 440 444	3 302 305	3 155 158	3 149 152	66 3319 3385
2. The swearing-in of Johnson as President	2 10 12	6 81 87	1 74 75	2 77 79	1 90 91	0 55[d] 55	1 41 42	0 47[d] 47	0 0 0	0 0 0	13 475 488
3. The assassination of Oswald	0 0 0	0 0 0	1 45 46	15 283 298	4 338 342	2 241 243	4 257 261	0 162[d] 162	3 116 119	2 182 184	31 1624 1655
4. The establishment of the Warren Commission	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	2 119 121	2 145 147	4 264 268
Total No. of Theme Occurrences on RL during the Day	6 66 72	16 338 404	10 441 451	37 855 892	11 1010 1021	7 807 814	9 738 747	3 511 514	8 390 398	7 476 483	114 5682 5796

[a] No. of RL occurrences found in the content analysis.

[b] Additional no. of RL occurrences inferred.

[c] Total no. of RL occurrences.

[d] In the inferential procedure used it sometimes happened that a message occurrence found in the content analysis on day n implied one or more message occurrences on day n+1.

show estimated totals of 754 theme occurrences in three Voice of America media, 717 theme occurrences in three British Broadcasting Corporation media, and 5,796 theme occurrences in three Radio Liberty media.[15] As in the case of the Cuban crisis scenario, these differences reflect, in part, the amount of daily broadcasting by each of the stations and, in part, the way we defined messages for each of the stations. It is not surprising to note that in all three foreign radio message schedules the most important theme in the scenario--President Kennedy's assassination--appears with the greatest frequency, while a theme of relatively low salience--the Warren Commission's establishment--appears with the lowest frequency.

More worthy of note, perhaps, is the difference between the message schedules obtained for VOA and the BBC, on the one hand, and Radio Liberty on the other. Theme 3, "the assassination of Oswald," occurs with a greater relative frequency in the Radio Liberty message schedule than in the VOA and BBC schedules, and theme 2, "the swearing-in of Johnson as President," occurs with a lower relative frequency in the Radio Liberty message schedule than in either of the other two foreign radio schedules. If we interpret total occurrences of assassination themes (1 and 3) as an index of dramatic or emotional coverage, and total occurrences of Johnson themes (2 and 4) as an index of factual or objective coverage, then these differences suggest that both VOA and the BBC were significantly less emotional than Radio

---

[15]For the portions of the day which each of these nine media span see Appendix B (Tables B.17, B.19, and B.22).

Liberty in their Kennedy assassination reportage.[16]

It is also interesting to compare the message schedules obtained for foreign radio with those obtained for Soviet print and electronic media. Figure 7.1 shows the total number of occurrences of each of the four themes in the message schedules synthesized for the three Soviet media types and the three foreign radio media. It can be seen that a substantial majority of the theme occurrences in both the Soviet and foreign radio message schedules are related to the assassination of President Kennedy (65% and 60%), and that an insignificant proportion of the total theme occurrences in both schedules pertain to the establishment of the Warren Commission (2% and 4%). For Johnson's swearing-in and Oswald's assassination, however, the comparison is more interesting. Soviet media as a whole gave greater relative emphasis to Johnson's swearing-in and less relative emphasis to Oswald's killing than did foreign radio media as a whole, but this difference is somewhat misleading because it reflects the disproportionate influence of Radio Liberty in the foreign radio message count. It is important to note, however, that the Soviet electronic media's coverage of themes 2 and 3 resembled that of VOA and the BBC, while the Russian press appears to have functioned more like Radio Liberty in this regard. The pattern we have been describing probably

---

[16]These conclusions should be regarded as highly tentative because, for reasons outlined in Chapter VI, coding reliability and validity probably were somewhat lower in the foreign radio content analyses than in the content analyses done for Soviet domestic media.

Themes Coded	Soviet Media	Press	Radio	TV	Foreign Radio	BBC	RL	VOA
1. The assassination of President Kennedy	1691 (65%)*	811 (79%)	396 (54%)	484 (58%)	4327 (60%)	495 (69%)	3385 (58%)	447 (60%)
2. The swearing-in of Johnson as President	543 (21%)	34 (3%)	250 (34%)	259 (31%)	909 (12%)	166 (23%)	488 (8%)	255 (34%)
3. The assassination of Oswald	311 (12%)	163 (16%)	70 (9%)	78 (9%)	1731 (24%)	35 (5%)	1655 (29%)	41 (5%)
4. The establishment of the Warren Commission	58 (2%)	22 (2%)	20 (3%)	16 (2%)	300 (4%)	21 (3%)	268 (5%)	11 (1%)
Total No. of Theme Occurrences	2603	1030	736	837	7267	717	5796	754

*Percentage of the total no. of theme occurrences in the media type or group.

Fig. 7.1--Occurrences of four themes in the message schedules input to the Kennedy assassination simulation for Soviet press, radio, TV, and foreign radio.

reflects the fact that it is the authoritative foreign radio stations, such as VOA and (more especially) the BBC, which exert a competitive influence on Soviet radio and television programming.

The message schedule

Table 7.7 shows the message schedule used for the Kennedy assassination simulation. It simply combines the schedules obtained for the Soviet press, radio, and television, and for Voice of America, Radio Liberty, and the British Broadcasting Corporation. In summary, the content analyses from which these schedules were derived covered a sample of the material that appeared during the aftermath of the Kennedy assassination in twenty-eight of the fifty-six media conceptualized in the simulation. Approximately 7,000 different articles and broadcasts were coded in all (including the broadcasts duplicated for the television content inference), resulting in a total of 1,628 occurrences of the four themes in the twenty-eight media. Combining the content analyses with print periodicities and broadcast schedules we inferred an additional 8,256 occurrences of the four themes in these and the other twenty-eight simulated media, resulting in an estimated total of 9,884 occurrences of the four themes in the fifty-six simulated media during the first ten days following the Kennedy assassination.

Table 7.7--Message schedule for the Kennedy assassination simulation, November 22nd-December 1st, 1963.

Themes Coded	DAY 22	23	24	25	26	27	28	29	30	1	Total No. of Occurrences of the Theme
1. The assassination of President Kennedy	13[a] 146[b] 159[c]	104 588 692	252 646 898[d]	146 733 879(o)	181 807 [e]988(o)	107 664 771(o)	87 538 625(o)	74 359 433(o)	67 250 317(o)	44 217 261(o)	1075 4948 6023(1749)
2. The swearing-in of Johnson as President	4 49 53	45 217 262	44 138 182[d]	15 161 176	49 138 187	40 143 183	51 123 174	32 74 106	30 47 77	21 32 53	331 1122 1453
3. The assassination of Oswald	0 0 0	0 0 0	5 51 56	23 314 337	44 386 430	50 296 346	19 263 282	16 178 194	15 141 156(o)	34 214 248(o)[d]	206 1843 2049(1645)
4. The establishment of the Warren Commission	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	17 151 168	13 178 191[d]	30 329 359
Total No. of Theme Occurrences during the Day	17 195 212	149 805 954	301 835 1136	184 1208 1392 (513)	274 1331 1605 (617)	197 1103 1300 (529)	157 924 1081 (456)	122 611 733 (300)	129 589 718 (245)	112 641 753 (244)	1628 8256 9884(5206)

Table 7.7--Continued

[a]No. of theme occurrences found in the content analyses.

[b]Additional no. of theme occurrences inferred.

[c]Estimated total no. of theme occurrences.

[d]We have assumed that members of the Soviet population who would have attended oral agitation meetings attended, on the average, two such meetings during the ten-day period encompassed by the Kennedy assassination simulation. We have also assumed that the bulk of Soviet oral agitation meetings during the Cuban crisis period occurred on November 24th and December 1st, and we have arbitrarily set the thematic content of these meetings equal to the thematic content of Pravda on the 27th. As a result, the estimated total number of occurrences for each of themes 1 and 2 includes, respectively, 5 and 1 oral agitation occurrences on the 24th, and for each of themes 3 and 4 it includes, respectively, 7 and 1 oral agitation occurrences. (Each oral agitation message was arbitrarily assigned the format factor that had been assigned to short news items appearing in Pravda, the latter being the most common format for newspaper stories.)

[e]The simulation allows a maximum of 1,800 occurrences of any single theme in a scenario. For this reason 4,678 of the estimated 9,884 occurrences of the four themes had to be omitted in constructing the message schedule for the scenario. For themes 1 and 3 the zeives in parentheses indicate time periods for which the simulation could not accept messages as a result of this constraint. Even though the omission of messages was not distributed evenly across individual themes, it did not affect the validity of the simulation results, for the following reasons: No messages had to be omitted during the first three time periods for theme 1 and the first eight time periods for theme 3; simulation results indicate that by the end of these intervals the population had been saturated with exposure to each of these two themes; our analysis of the simulation results for these themes is confined to the pre-saturation period.

Changes in Soviet Habits of Media Use and Message Response Triggered by the Assassination

In order to account for changing levels of interest in themes over the period encompassed by a given scenario, the simulation programs have been designed so that a researcher can superimpose dynamic potentialities on the computer population's stable habits of media use and message response. We now proceed to describe how dynamics of this kind were specified for the simulated Soviet population in the Kennedy assassination scenario.

To account for the Soviet population's changing level of interest in themes related to the assassination of President Kennedy we modified individual exposure probabilities as a function of time, i.e., as a function of the stage of the scenario, rather than on the basis of individual exposure histories. As in the case of the Cuban crisis simulation, this choice was dictated by convenience. The available data on changes in Soviet media-consumption and message-response behavior during the aftermath of Kennedy's assassination were qualitative in nature and were organized in terms of time elapsed since the assassination. From the source materials on Soviet media coverage cited above (n. , p.), we were able to reconstruct the following picture: All strata of Soviet society appear to have learned about the assassination fairly rapidly. The educated elite and the broad masses alike became active information-seekers as soon as they heard the news, rushing to their radio and television sets to learn more about the assassination. In addition, there was a spontaneous outpouring of grief within the USSR, and this emotion was probably sustained and intensified when the population viewed Kennedy's funeral, broadcast live via satellite TV, on November 25th. According to one observer, Russian streets were virtually empty during the funeral telecast because nearly everyone was watching a set. In addition to experiencing a genuine feeling of grief over the slain President, the Soviet people also felt apprehensive about Kennedy's successor and how his policies would affect relations between their country and the U.S. After the funeral telecast, interest in assassination themes probably began to subside among all strata of the population. Patterns of media consumption and theme response appear to have gradually returned to normal as the drama of the weekend faded away.

As in the case of the Cuban crisis, there seem to have been two distinct levels of awareness within the USSR during the aftermath of the Kennedy assassination. The poorer-educated, less politically involved segments of the Soviet population apparently exhibited a more emotional type of reaction, their interest and concern focusing mainly on the personal dimensions of the tragedy, while the better-educated, more politically sophisticated probably were more aware of and interested in the details and complexities of the Dallas investigation and the implications of Oswald's arrest and subsequent murder.

To reflect the foregoing dynamics in the Kennedy assassination scenario we specified the probability modifications described in

Figure 7.2. In Chapter VI we explained the rationale underlying the specific values given to the various parameters of probability modification. The only difference in these parameters between the Cuban crisis and the Kennedy assassination scenarios is in the time dependence of probability modifications. By specifying November 22nd as the day on which each probability increase began and November 23rd as the day on which it reached its full extent, in the Kennedy assassination scenario, we insured that there would be no probability increments on the 22nd and that all increments would have their full effect on the 23rd. Similarly, by specifying November 25th as the day on which each probability increase began to recede and December 1st as the day on which it no longer existed, we insured that all probability increments would retain their full effects until the 25th and diminish in six equal steps each day thereafter until, on December 1st, they would no longer have any effect.

Time phasing of all probability modifications

Modification Starts to Take Effect:	November 22nd (T=1)
Modification Has Its Full Effect:	November 23rd (T=2)
Modification Starts to Recede:	November 25th (T=4)
Modification No Longer Has Any Effect:	December 1st (T=10)

	Modification #1			Modification #2		
Direction and Magnitude	Normal p	0.0	0.5	Normal p	0.0	0.5
	New p	0.2	0.6	New p	0.2	0.6

	Modification #1	Modification #2
Types of Media Affected	Newspapers Television Radio Foreign Radio Oral Agitation	Radio Foreign Radio Oral Agitation
Types of Persons Affected:	Those with >10 yrs. ed. Those with ≥7, ≤10 yrs. ed.	Those with ≥4, <7 yrs. ed. Those with <4 yrs. ed.
Types of Probabilities Affected:	Message Exposure	Message Exposure

Fig. 7.2--Changes in Soviet message exposure probabilities hypothesized for the Kennedy assassination simulation.

The Simulated Pattern of Theme Exposures

We are now ready to describe and analyze the simulated Soviet population's exposure to themes in the Kennedy assassination scenario. As in Chapter VI, we will examine in turn the buildup of exposures to individual themes, the distribution of theme exposures across various population subgroups, the duplication of exposures between pairs of themes, and the relative importance of different types of media in diffusing themes.

We have tabulated and plotted in various ways the time series of exposures produced by the simulation, and our analysis will be organized around the resulting tables and graphs. Most of the background information required for interpreting these exhibits has already been set forth in Chapter VI. Before turning to the analysis, however, we must explain certain features of the tables and graphs that are specific to the 1963 scenario.

On each graph that we will analyze, the horizontal axis again indicates the days of the crisis. It covers the period from November 22nd to December 1st, 1963, or some portion of that interval. As in the Cuban crisis graphs, a given abscissa represents the end of a period running from 4:00 a.m. Moscow Central Time on the day with which it is labeled to 3:59 a.m. Moscow Central time on the following day.

Because of an error in the simulation program which was described in Chapter VI, our specification that assassination-triggered increases be applied to message exposure probabilities (rather than to probabilities of exposure to a medium or to a message in a medium) caused the simulation to ignore the effective exposure ceilings dictated by illiteracy rates and incomplete television and foreign radio diffusion networks within the USSR. This had the effect of artificially inflating the rate of buildup and the ultimate level of theme exposures via each type of medium. We therefore restrict our comparative analysis to the period before the hypothesized probability increases were operant.[17]

The final feature of the tables and graphs requiring explanation is the way in which they represent time. News of President Kennedy's death was made public on Friday afternoon, November 22nd, 1963, at 2:30 p.m. Eastern Standard Time. In terms of Moscow Central time the news was therefore released on Friday evening, November 22nd, at 9:30 p.m. We chose to begin the Kennedy assassination simulation at 4:00 a.m. Moscow Central time on Friday morning, November 22nd. As in the case of the Cuban crisis, tabulated and plotted exposure values represent statistics <u>at the end of</u> the indicated intervals or days. For example, Graph 7.1 shows that over fifty per cent of the Soviet population was exposed to some mass media information

---

[17] Fortunately, the simulation results indicate that the Soviet population's cumulative and repeat exposure to two of the four Kennedy assassination themes reached a significant level before the point at which we initiated assassination-triggered increases in message exposure probabilities. Accordingly, the role played by the mass media in diffusing news of the Kennedy assassination to the Soviet population is largely observable in the "pre-triggering" portion of the simulation output.

about the assassination of President Kennedy at the end of the first simulation time period, i.e., by 4:00 a.m. Moscow Central Time on the morning of November 23rd, or six and one-half hours after news of the President's death had been made public.

Having noted these important features of the data, we are now ready to analyze the simulated time series of Soviet exposures to themes about the assassination of President Kennedy.

The buildup of theme exposures

In Table 7.8 we present some of the important input and output statistics for two of the themes in the Kennedy assassination scenario.[18] For each theme the table shows the number of messages in the simulated media, the number of exposures to those messages within the simulated population, the average number of exposures per person in the population as a whole, the average number of exposures per message, the number of persons exposed at least once to each theme, the number of persons exposed at least once per message, and the average number of exposures per person in the exposed population. These statistics are the values at the end of the first time period (or at the end of a simulated

[18] Not shown are the exposure outcomes for theme 3, "the assassination of Oswald," which did not begin until time period 3 (November 24th), and theme 4, "the establishment of the Warren Commission," which did not begin until time period 9 (November 30th). Exposure outcomes for these themes were distorted by a programming error in the probability-triggering routine described in Chapter VI.

Table 7.8--The exposure of the simulated Soviet population to individual Kennedy assassination themes after twenty-four hours of the scenario.*

Theme	A Number of Messages	B Number of Exposures	C Average Number of Exposures Per Person (B/1,200)	D Average Number of Exposures Per Message (B/A)	E Number of Persons Exposed (At Least Once) (Pop.=1200)	F Number of Persons Exposed (At Least Once) Per Message (E/A)	G Average Number of Exposures Per Exposed Person (B/E)
1. The assassination of President Kennedy	159	2112	1.8	13.3	625	3.9	3.4
2. The swearing-in of Johnson as President	53	827	0.7	15.6	403	7.6	2.1

*The third and fourth themes did not begin until time periods (November) and (November) respectively. Exposure outcomes for these themes are not shown because they were distorted by a programming error in the probability-triggering routine (see Chapter VI, pp. for details).

twenty-four hour interval). We choose a one-day "snapshot" of the population's theme exposure for purposes of analysis because, by the end of this period, substantial proportions of the population had been exposed to the two most important themes in the scenario, and the distortions produced by crisis-triggered probability increases had not yet begun to occur.

The number of exposures for the population as a whole at the end of the first day ranges from 827 exposures to the theme of Johnson's swearing-in, for which 53 messages appeared, to 2,112 exposures to the theme of Kennedy's assassination, for which there were 159 messages. The exposure difference between themes 1 and 2 suggests, not surprisingly, that a significantly greater number of messages carrying the Kennedy assassination theme reached the Russian population than messages carrying the presidential succession theme. It is interesting to note that while the number of messages carrying the first theme during the first time period is exactly three times the number of messages carrying the second theme, the total and average number of exposures to the former are only about two and one-half times the corresponding figures for the latter.

The source of this disparity between coverage and exposure can be attributed to the fact that the average number of exposures to a message conveying the Kennedy assassination theme (13.3) is somewhat less than the average number of exposures to a message conveying the presidential succession theme (15.6). This average is just the expected number of exposures for the population divided by the number of messages. As we pointed out in Chapter VI, it depends on the sizes of the average audiences for the media in which the messages for a theme appear, and on the formatting of those messages. Therefore, the simulation results indicate, perhaps somewhat surprisingly, that the audiences for media in which most mentions of the new U.S. President appeared were slightly larger, on the average, than the audiences for media in which most mentions of President Kennedy's assassination appeared, and that the formatting of messages for the presidential succession theme was probably not much less salient, on the average, than the formatting of messages for the Kennedy assassination theme.

In spite of this difference between themes 1 and 2, however, the most interesting aspect of the simulation output summarized in Table 7.8 is the rate at which the Soviet population was exposed to both themes. While the average numbers of exposures to the two themes are 1.8 and 0.7 respectively, for the population as a whole at the end of the first time period, we note that over fifty per cent of the population (625 simulated persons) was exposed at least once to the Kennedy assassination theme and more than one-third of the population (403 simulated persons) was exposed at least once to the theme of Johnson's swearing-in. These figures suggest that substantial segments of the Soviet population were exposed to news of the principal consequences of the tragedy within seven hours of Kennedy's death. Moreover, it seems probable that two or three exposures in this short a period would have been sufficient to alter the cognition of the average exposed person. Accordingly, the simulation results suggest that a substantial segment of the Russian people had learned of President Kennedy's assassination and his succession by Lyndon Johnson within a matter of hours after these events occurred.[19]

It is interesting to compare these outcomes with the Cuban crisis results. From our discussion in Chapter VI the reader will recall that it was not until some twenty-six hours after President Kennedy's quarantine speech that cumulative exposure levels within the Soviet population reached the 30-60 per cent range (in all but the case of one theme). The two Kennedy assassination themes, on the other hand, attained that degree of penetration within six hours of the President's death. This difference is even more significant when one recalls that the story of President Kennedy's assassination broke during the late evening hours, Moscow time, while the Cuban

---

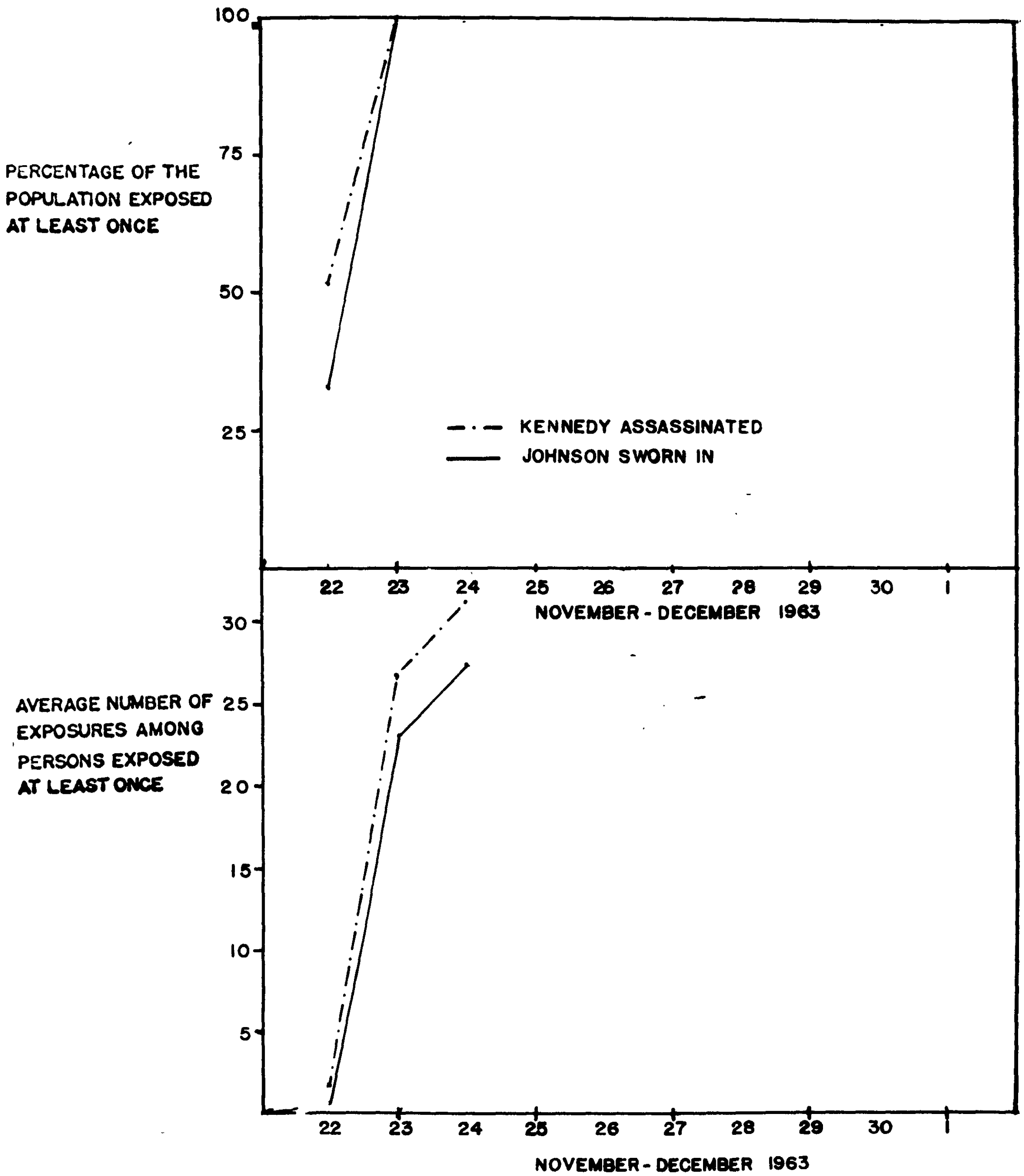
[19] This represents an extraordinarily high penetration rate for a news event emanating from the non-Communist world. It is difficult to make a comparison with corresponding figures in the West, however, because of the way in which the latter are reported. For example, Sheatsley and Feldman cite the results of a NORC survey showing two-thirds of the American public reached with news of the event in one hour, ninety per cent in two hours, and virtually everybody in less than four hours (Paul B. Sheatsley and Jacob J. Feldman, "The Assassination of President Kennedy: A Preliminary Report on Public Reactions and Behavior," Public Opinion Quarterly, XXVIII (Summer, 1964), 189-215). The authors report that about half of the people in these statistics (47%) first received word of the assassination by means of radio or television, another forty-nine per cent through telephone calls or personal messages, and the remaining four per cent from newspapers or other sources, but they do not indicate (possibly because the survey did not) what percentages of the population were reached at least once by the mass media.

missile crisis erupted during the early part of the morning. Thus, while both the Cuban crisis and the Kennedy assassination were fast-breaking, rapidly-diffused international news events, it seems apparent that the Kennedy assassination themes penetrated the Soviet population much faster and in far greater depth.

We have been analyzing a simulated record of the Soviet population's exposure to Kennedy assassination themes at a given point in time--seven hours after President Kennedy's death. To put this analysis in a dynamic perspective we now consider Graph 7.1, which shows the simulated buildup of cumulative and repeat exposure over a period of several days.[20] As one would expect, the difference in cumulative exposure to the two themes narrows over time. We also note that by the end of the second time period, some thirty-one hours after President Kennedy's death, virtually 100 per cent of the Soviet population has been exposed at least once to each of the themes, and that the average person has been exposed well over twenty times to each theme. Finally, we observe that, while the difference in cumulative exposure to the two themes tends to narrow over time, the difference in repeat exposure apparently broadens somewhat, at least between the first two time periods. This reflects the fact that after November 22nd each additional exposure to the Kennedy assassination theme was more likely, on the average, to involve a person already exposed to that theme than each additional exposure to the presidential succession theme.

---

[20] Exposure outcomes for themes 3 and 4 are not shown for the reasons discussed in n.   on p.



Graph 7.1. -- KENNEDY ASSASSINATION: REACH AND FREQUENCY BY THEME

The distribution of theme exposures over population subgroups

For the simulation population as a whole, and for each level of the "age" and "education" dimensions, Table 7.9 shows the cumulative percentage of persons exposed to individual Kennedy assassination themes at least once and the average cumulative number of exposures per person among those exposed at least once, after one time period of the scenario. The number of exposures per person is slightly undercounted for each theme, for reasons discussed in Chapter VI. By comparing the expected average number of exposures per exposed person in the simulation population as a whole (Table 7.9) with the corresponding statistic summed over the various media types (Table 7.8), we can determine the total amount of undercounting for each theme. The comparison shows that by the end of the first time period only 3.0 per cent of the exposures to theme 1 were uncounted and none of the exposures to theme 2 were uncounted. The reader will recall from our discussion in Chapter VI that the nature of this undercounting is such that its magnitude increases with the expected average number of exposures per person. As a result, those population subgroups having the greatest repeat exposure to the Kennedy assassination theme are probably also the ones for which this statistic is most underestimated.

The cumulative and repeat exposure figures in Table 7.9 differ significantly between the two themes, and for each individual theme the exposure figures also vary within socio-demographic categories.

Table 7.9--Cumulative and repeat exposure of selected subgroups of the simulated Soviet population to individual Kennedy assassination themes after twenty-four hours of the scenario.[a]

Theme	Total Population	Age			Education			
		16-29	30-49	50+	<4	≥4, <7	≥7, ≤10	>10
1. The assassination of President Kennedy	52.1[b] (3.3)[c]	57.8 (3.3)	49.1 (3.5)	48.4 (3.1)	41.8 (3.1)	58.9 (3.2)	53.3 (3.2)	76.5 (3.9)
2. The swearing-in of Johnson as President	33.6 (2.1)	37.6 (2.1)	32.3 (2.2)	29.8 (2.0)	26.0 (1.9)	38.0 (1.8)	33.8 (2.1)	61.8 (2.6)

[a]Exposure outcomes for themes 3 and 4 are not shown for reasons discussed in the footnote to Table 7.8. For each theme, the data in Table 7.9 underestimate repeat exposure (average number of exposures per person among those exposed at least once), especially in the subgroups with greatest exposure (see Chapter VI, pp.   for details).

[b]Cumulative percentage exposed at least once.

[c]Average number of exposures per person among those exposed at least once.

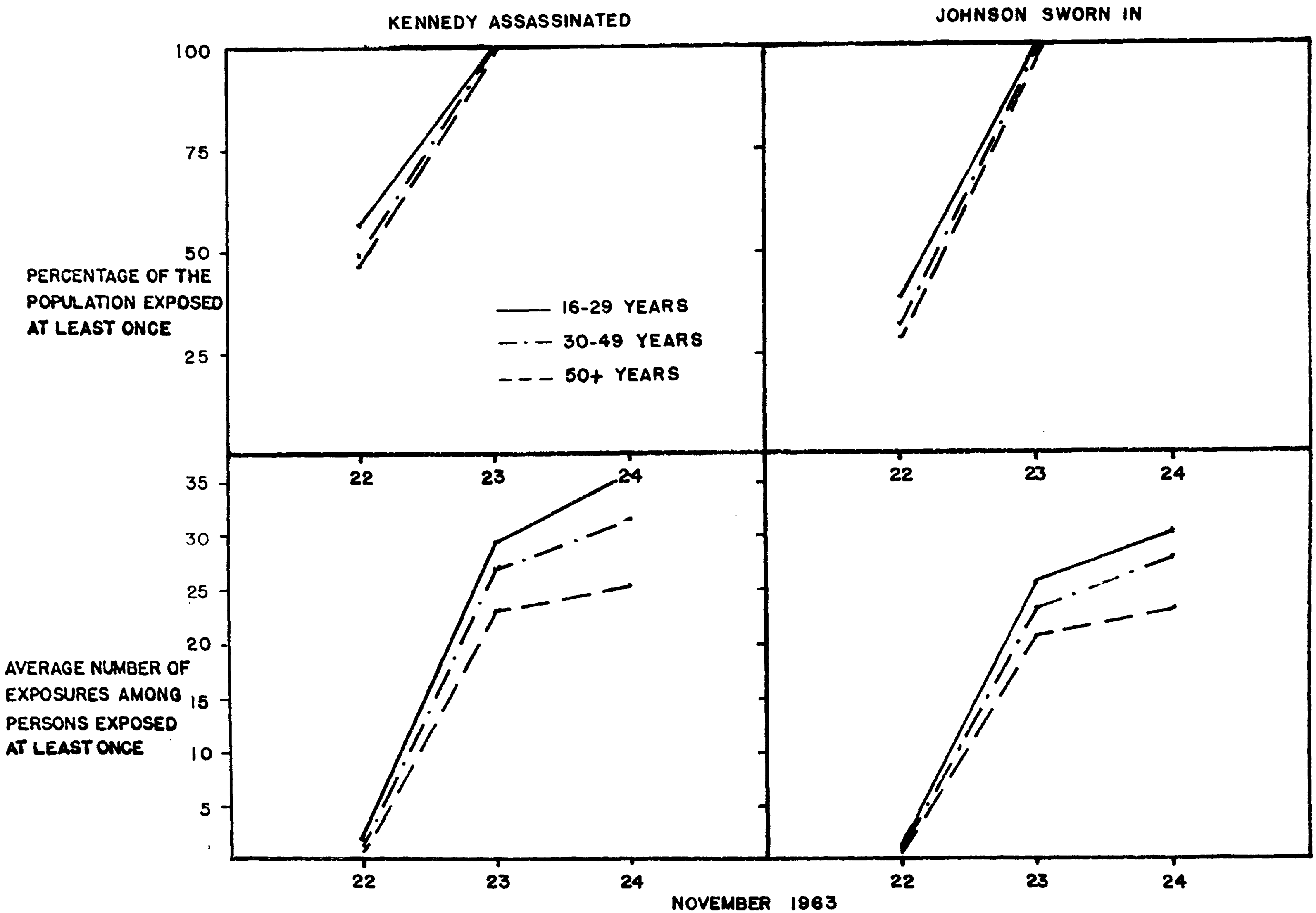
In every case, however, we find greater exposure to theme 1 and, as in the Cuban crisis exposure outcomes, young people more exposed than older people, educated people more exposed than the less well-educated. (The simulation results also showed urbanites slightly more exposed to Kennedy assassination themes than rural persons. Once again, however, they showed no significant exposure differences by "sex" or "political involvement.") Persons with more than ten years of education have 34.7 and 35.8 per cent more cumulative exposure to themes 1 and 2, respectively, than persons with less than four years of education. The corresponding ranges on the age dimension are 9.4 and 7.8 per cent. These simulation outcomes suggest the same type of conclusion reached on the basis of the Cuban crisis results, viz., that (1) the "education" dimension accounts for more of the variation in exposure to Kennedy assassination themes over subgroups of the Soviet population than either the "sex", "age", "political involvement", or "residence" dimension, and (2) the "age" dimension explains more of the residual variation than either the "sex", "political involvement", or "residence" dimension.

An interesting and important feature of Table 7.9 is the pattern of exposure differences which it reveals. Seven hours after President Kennedy's assassination, at least forty per cent, and in most cases a majority, of the Russians on each dimension level had been exposed at least once to news of the assassination. At the same time, however, with the exception of persons having greater than ten years of education, between two-thirds and three-quarters of the

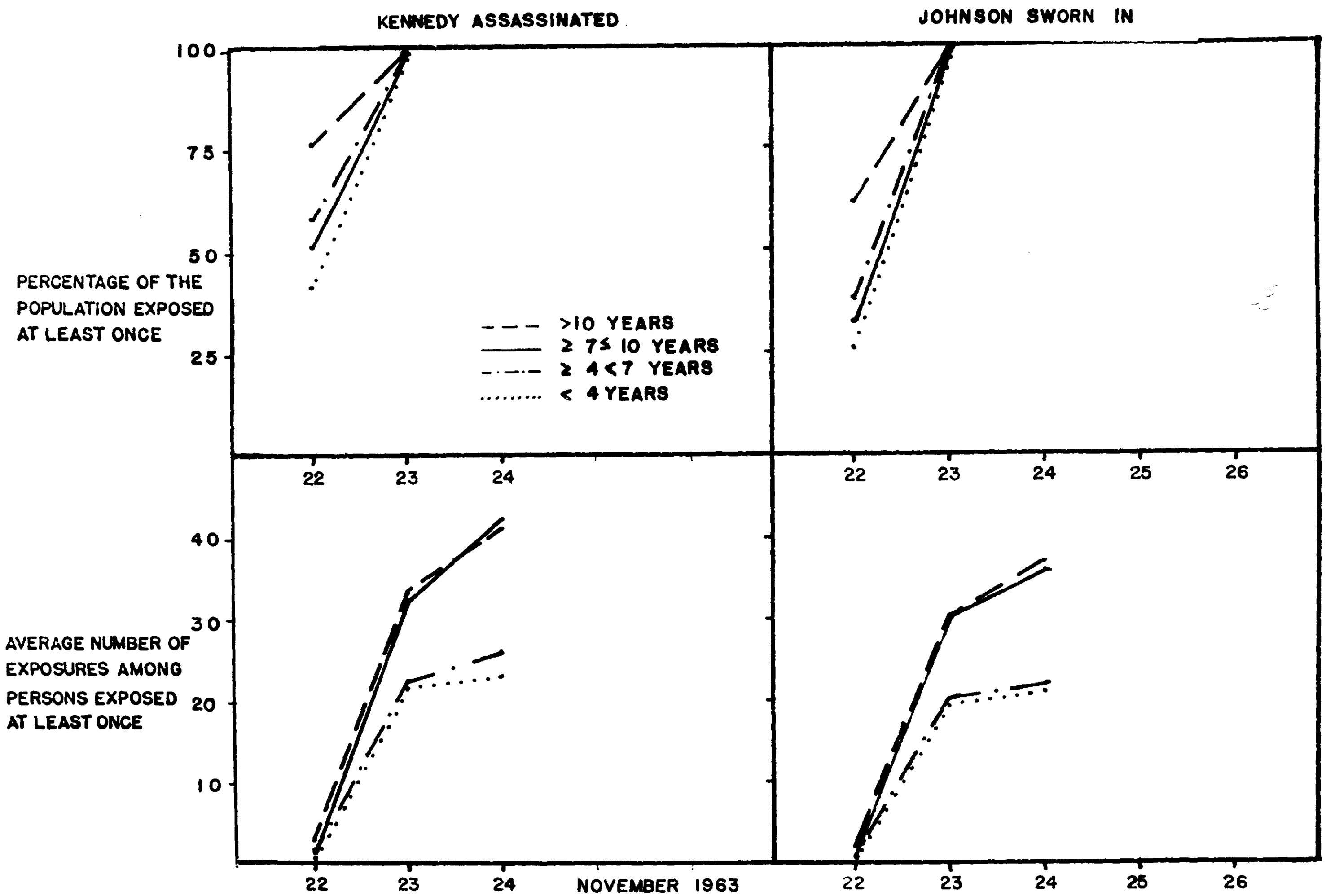
Russians on each dimension level had not been exposed to any media reports that Lyndon Johnson was the new President. This pattern suggests that as long as seven hours after President Kennedy's death, the combination of Soviet domestic media and incoming foreign radio still had not reached a substantial majority of the Soviet population with the news that Lyndon Johnson was the new American President.

Graphs 7.2 and 7.3 show the buildup of cumulative and repeat exposure to the two Kennedy assassination themes over a period of days, on each level of the "age" and "education" dimensions, in the simulated Soviet population.[21] We note that the general pattern observed at the end of the first time period (Table 7.9) prevails at the end of the second and third time periods as well: the better-educated and the young more rapidly and heavily exposed than those with less education and older people. (At the end of the second and third time periods the simulation results also showed urbanites slightly more exposed than rural dwellers, small and inconsistent exposure differences by "sex" and "political involvement.") With regard to the diffusion of the presidential succession theme among various population subgroups, we observe that cumulative exposure to

[21]The repeat exposure figures in the lower portions of these graphs are slightly underestimated, for reasons discussed in Chapter VI. We mentioned above that the undercounting is greatest for those themes which have the highest number of exposures per exposed person. Therefore, in the bottom portions of Graphs 7.3 and 7.4, the repeat exposure figures should be somewhat higher for each subgroup, the percentage increase rising with a subgroup's level of exposure and, hence, with succeeding time periods.



Graph 7.2.--KENNEDY ASSASSINATION: REACH AND FREQUENCY BY AGE



Graph 7.3. --KENNEDY ASSASSINATION: REACH AND FREQUENCY BY EDUCATION

the theme reaches nearly 100 per cent on each dimension level at the end of the second time period, and that repeat exposure on each dimension level has almost caught up to the corresponding statistic for the assassination theme. We therefore conclude that within thirty-one hours of President Kennedy's death, a combination of Soviet domestic reportage and foreign radio broadcasts to the USSR had succeeded in reaching the vast majority of persons in each substratum of the population.

Finally, some additional features of Graph 7.3 are worthy of note. For both the Kennedy assassination and the presidential succession themes the pattern of cumulative exposure differences over the "education" dimension has a clearly definable structure. Exposure builds more rapidly and to greater levels among persons with more than seven years of education, much less rapidly and to lower levels among persons in the other three education groupings, i.e., among persons with ten or less years of education. The reader will recall that we found a distinctly different pattern in the Cuban crisis exposure outcomes, viz., a tripartite structure in which the high, the two middle, and the low education groupings were distinctly separated. These results may reflect the following quite plausible set of conditions: In all communications situations the rate and level of cumulative exposure is distinctly greater among Russians having more than seven years of education than among the rest of the population. In a complex communications situation like the Cuban missile crisis, however, Russians in the two middle education groupings have markedly greater rates and levels of cumulative exposure than those of their countrymen with less than four years of education. But in a relatively simple human-interest type of communications situation like the aftermath of President Kennedy's assassination, Russians in the two education groupings with seven or less years of schooling do not differ substantially in their rates and levels of cumulative theme exposure.

For both the Kennedy assassination and the presidential succession themes the pattern of repeat exposure differences over the "education" dimension has a dichotomous structure. Exposure builds more rapidly and to greater levels among persons in the two education groupings with seven or more years of schooling, much less rapidly and to lower levels among persons in the lower two education groupings, i.e., among persons with less than seven years of education. The reader will recall that we found two different patterns in the Cuban crisis repeat exposure outcomes. For the pro-Russian theme we found a tripartite structure in which the high, the two middle, and the low education groupings were distinctly separate. For the pro-American theme, however, we found a dichotomous structure in which the high and the other three education groupings were separate.

These repeat exposure outcomes are almost exactly <u>opposite</u> to the cumulative exposure outcomes with regard to the penetration of levels on the "education" dimension. They may therefore reflect an interesting condition which can be posited as follows: The more education a Russian has, the more media he is likely to expose himself to, and the lower the degree in which the thematic content of these media is likely to overlap.

For the two Kennedy assassination themes Table 7.10 shows the most and least exposed subgroups in the simulated Soviet population, and for each of these subgroups, the cumulative percentage of persons exposed at least once and the average cumulative number of exposures among persons exposed at least once, after one time period of the scenario. There are several interesting features of these data.

First, we observe (as we did for population subgroups defined by one dimension at a time) that the levels of cumulative and repeat exposure differ substantially between the two themes and, for each theme, between the most and least exposed subgroups. It is interesting to note, however, that in both cases the most exposed subgroup is persons between the ages of sixteen and twenty-nine with more than ten years of education, and the least exposed subgroup is persons fifty years of age or older with less than four years of education.

The greater range of exposure is that for theme 2. The percentage of persons with more than ten years of education between the ages of sixteen and twenty-nine who were exposed at least once to the presidential succession theme after seven hours appears to have been almost four times the percentage of persons fifty or more years old with less than four years of education who were exposed at least once. The corresponding ratio for the Kennedy assassination theme is 2.4. These ranges undoubtedly represent the overrepresentation of the young and the well-educated in the audiences both of Soviet

Table 7.10--Most and least exposed subgroups of the simulated Soviet population, for individual Kennedy assassination themes, after twenty-four hours of the scenario.[a]

	Most Exposed		Least Exposed	
	Group	Exposure	Group	Exposure
1. The assassination of President Kennedy	Age 16-29 >10 yrs. ed.	92.8[b] (4.3)[c]	Age 50+ <4 yrs. ed.	39.3 (2.3)
2. The swearing-in of Johnson as President	Age 16-29 >10 yrs. ed.	78.6 (2.8)	Age 50+ <4 yrs. ed.	21.9 (1.4)

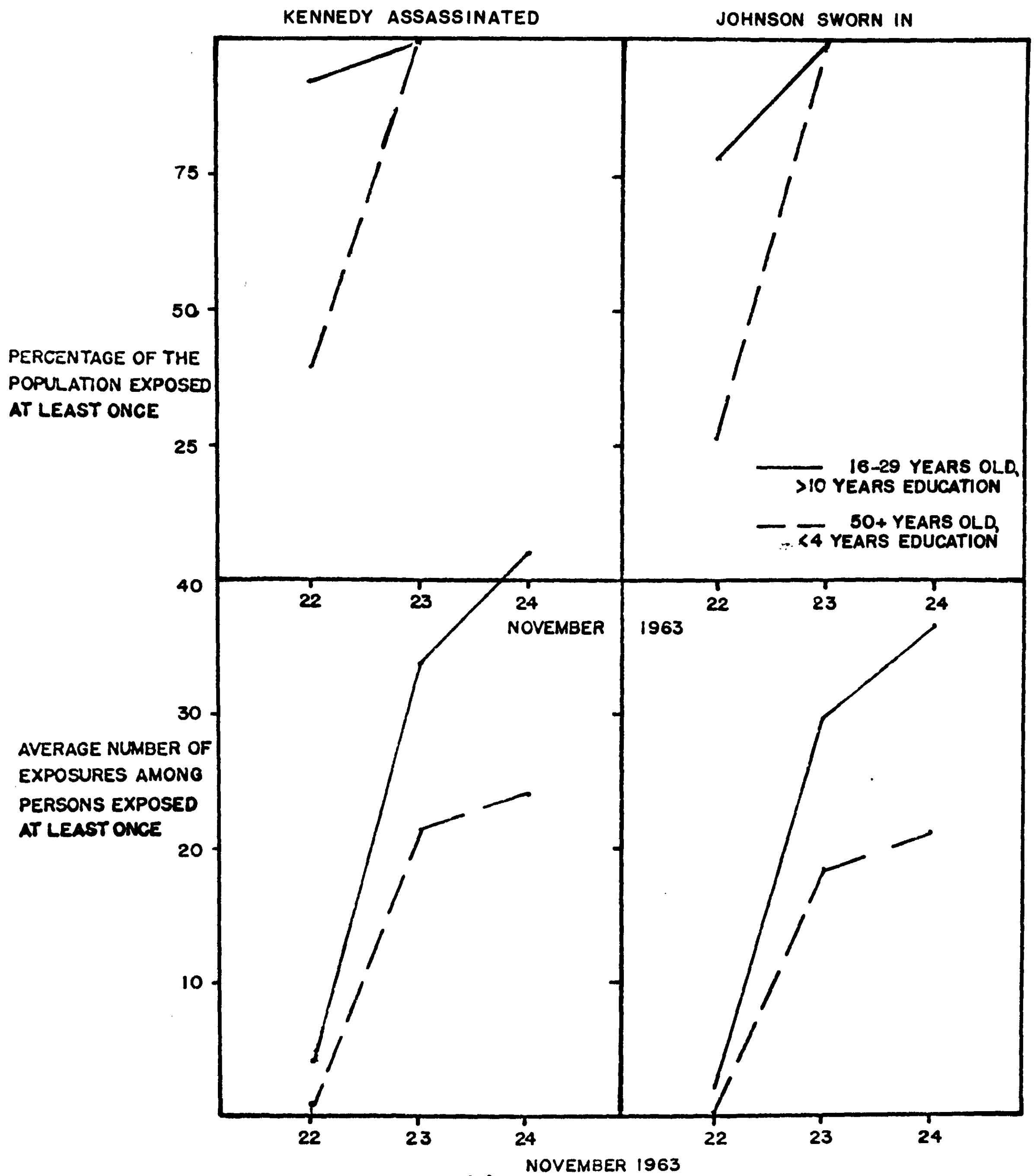
[a]Exposure outcomes for themes 3 and 4 are not shown for reasons discussed in the footnote to Table 7.8. Excluded from the comparison in Table 7.10 are subgroups of the simulation population containing less than 15 persons. There were six such groups: Female Party members (13); Party members, age 16-29 (11); Party members with less than 4 years of education (0); Party members with more than 10 years of education (9); rural dwellers with more than 10 years of education (7); persons 50 or more years of age with more than 10 years of education (7). For each theme the data underestimate repeat exposure (average number of exposures per person among those exposed at least once), especially in the subgroups with greatest exposure (see Chapter VII, pp.   for details).

[b]Cumulative percentage exposed at least once.

[c]Average number of exposures per person among those exposed at least once.

domestic media and foreign radio stations. It is interesting to note that the ranges in exposure are even greater than the differences we found on either the "age" or "education" dimension alone. Thus, the simulation results suggest, as in the case of the Cuban crisis, that more of the variation in exposure to Kennedy assassination themes is explained by "age" and "education" together than by either dimension alone.

Graph 7.4 shows, for the two Kennedy assassination themes, the buildup of cumulative and repeat exposure over a period of days, within the most and least exposed two-dimension subgroups of the simulated Soviet population. We note that the pattern observed at the end of the first time period (Table 7.10) prevails at the end of the second and third time periods as well: young, educated Russians more rapidly and heavily exposed than their older, less educated countrymen. We also observe that virtually 100 per cent of the Russians in the least exposed subgroup were exposed at least once to both themes by the end of the second time period. Moreover, the average person in this low-exposure group was exposed about twenty times to each of the themes. This suggests that virtually everyone within the nonmedia-immersed segment of Soviet society learned about President Kennedy's assassination and his succession by Lyndon Johnson within thirty-one hours of Kennedy's death, an outcome which undoubtedly reflects the effectiveness of Soviet domestic radio in reaching these people. The young, educated media-immersed segment of Soviet society was able to learn of the

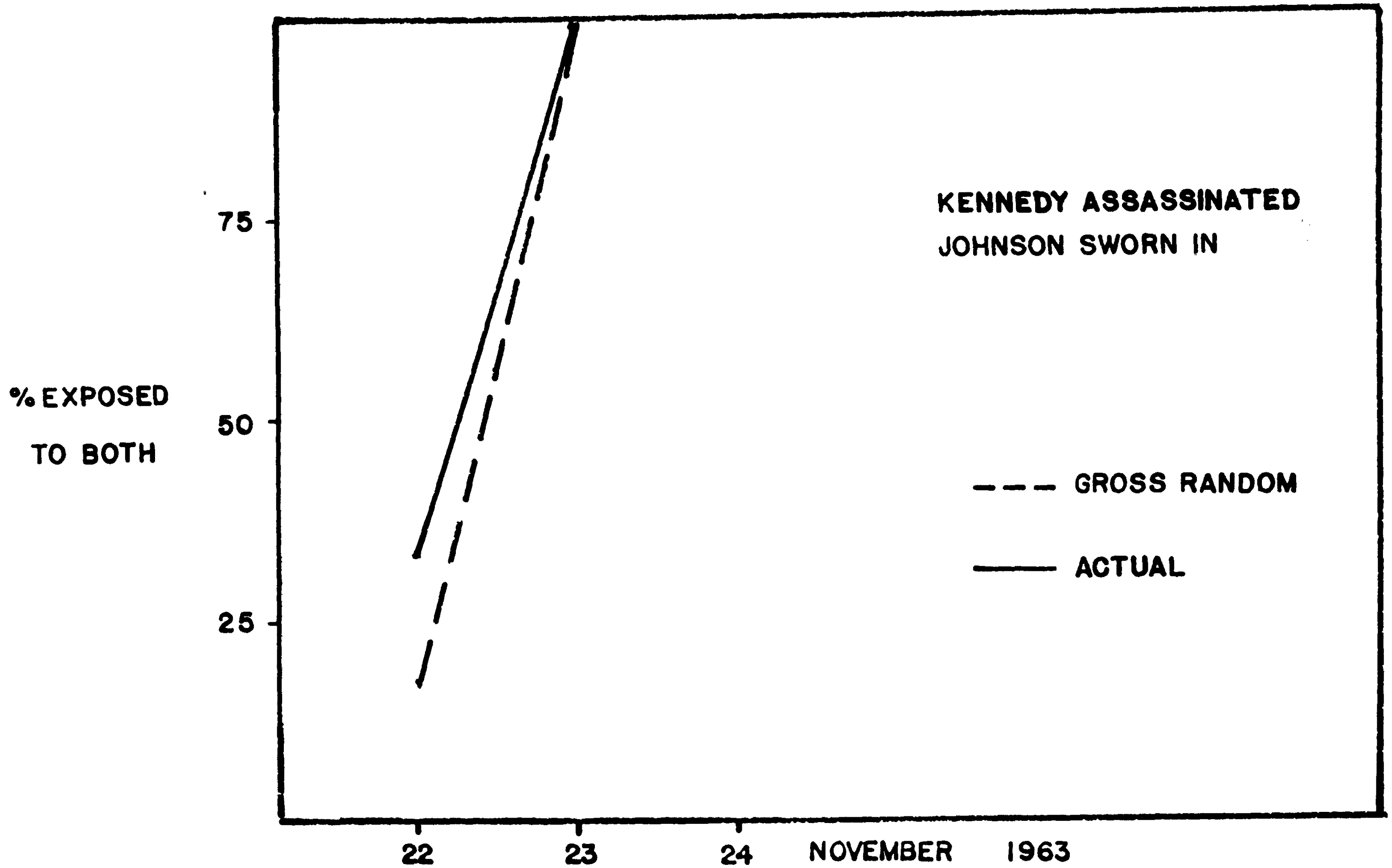


Graph 7.4.--KENNEDY ASSASSINATION: REACH AND FREQUENCY AMONG SELECTED AUDIENCE TYPES

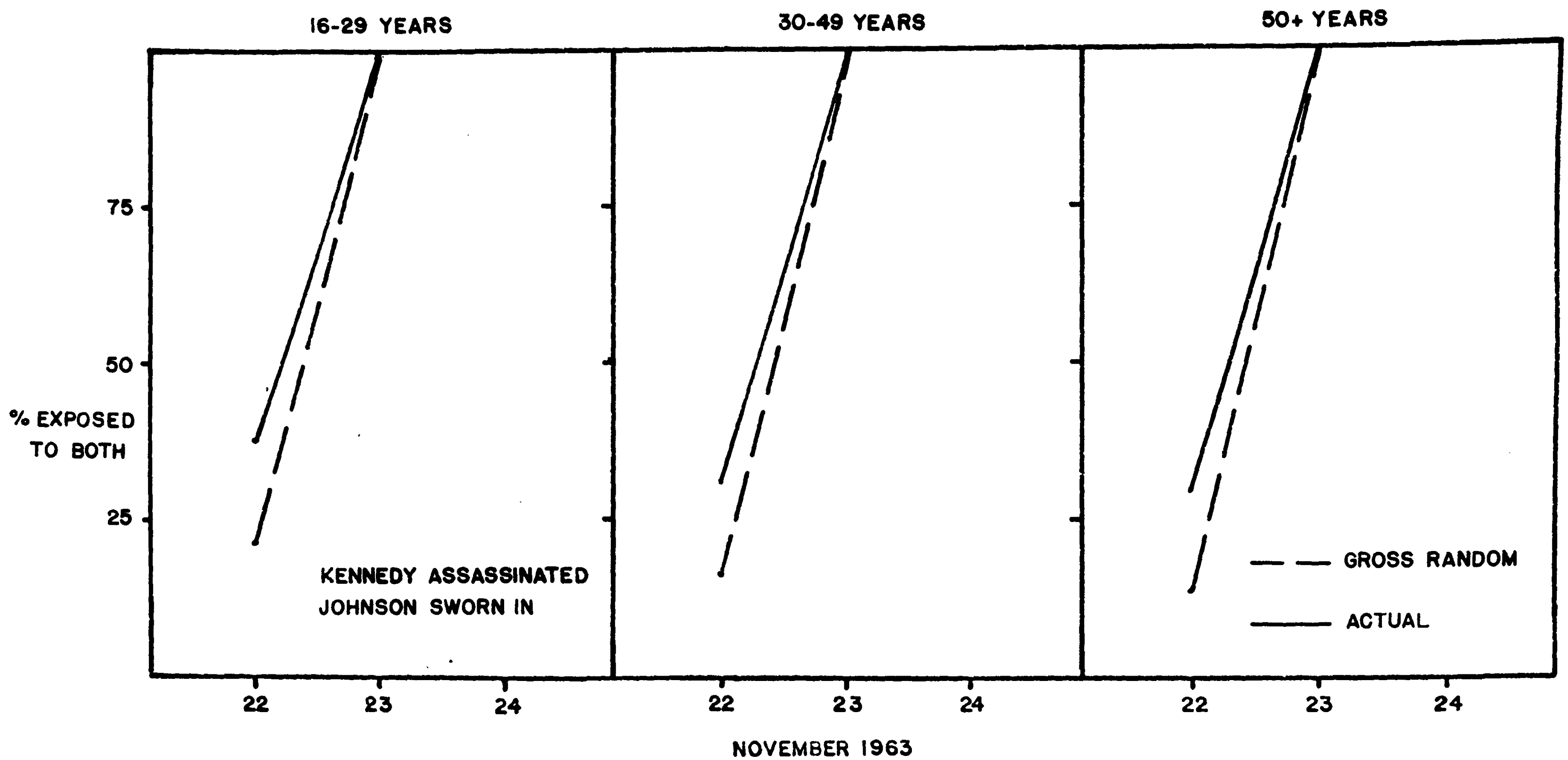
assassination and related events from all three domestic media types as well as from foreign radio. This situation is reflected in the simulation outcomes showing a more rapid initial buildup of cumulative exposure, and subsequently, a more rapid growth in repeat exposure among the high-exposure group.

The duplication of exposures between themes

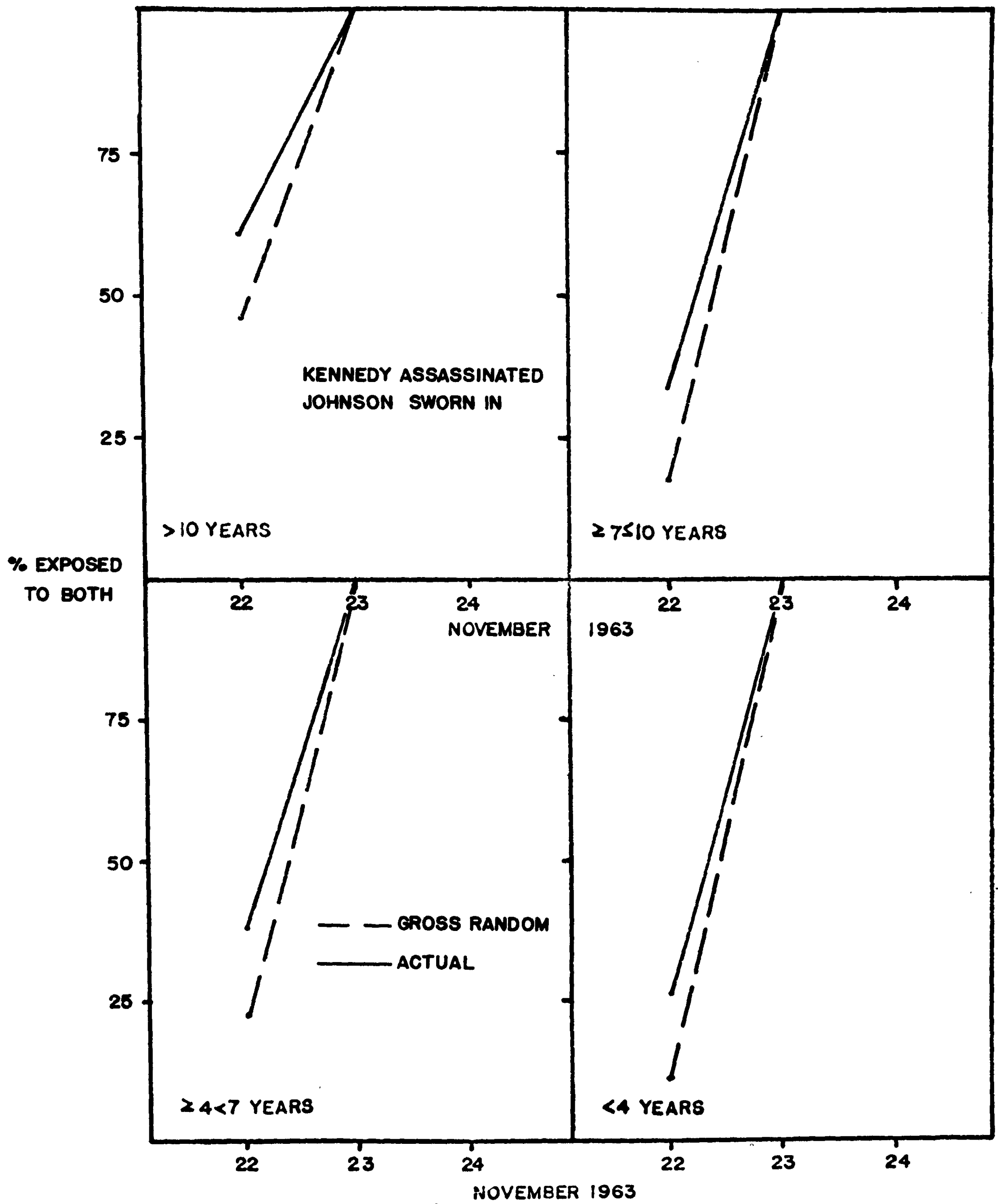
Graphs 7.5 through 7.7 show, for the population as a whole and for the "age" and "education" dimensions, the buildup over two days of the chance and actual audience duplications between the theme of President Kennedy's assassination and the theme of Johnson's swearing-in as President. The outcomes pictured in the graphs show that, within the simulated Soviet population as a whole, and among the persons on each level of the "age" and "education" dimensions, the duplicated audience between these two themes was significantly greater than that which would have been expected, at each stage of the scenario, on a chance basis. (The simulation output also showed this result on each level of the "sex", "political involvement", and "residence" dimensions.) These outcomes suggest that the types of persons likely to have been exposed to the key Kennedy assassination theme--reports on the murder of the President--were the same types of persons likely to have been exposed to other important themes, such as Johnson's having taken the oath of office as the new President. This result, which we also found in the Cuban crisis exposure outcomes, is not at all surprising. It simply reflects a



Graph 7.5.--KENNEDY ASSASSINATION: GROSS RANDOM AND ACTUAL DUPLICATED REACH FOR A PAIR OF THEMES



Graph 7.6.-- KENNEDY ASSASSINATION: GROSS RANDOM AND ACTUAL DUPLICATED REACH, BY AGE, FOR A PAIR OF THEMES



Graph 7.7. --KENNEDY ASSASSINATION: GROSS RANDOM AND ACTUAL DUPLICATED REACH, BY EDUCATION, FOR A PAIR OF THEMES

feature shared by most developed media systems: a substantial degree of overlap among the audiences for given media types and subtypes.

The role of the media in diffusing themes

Table 7.11 shows the distribution of exposures over media types for the two Kennedy assassination themes. These findings highlight the leading role played by domestic radio as the first mass media source of news about the assassination for most Russians. The distribution differs somewhat between the two themes, but in both cases Soviet domestic radio accounts for by far the single largest percentage of exposures. The Russian press does not account for exposures to either theme because the story broke, as we have said, after stop-press time. An interesting sidelight on these findings is the importance of foreign radio, which accounted for a significant percentage of the simulated Soviet population's exposures to each theme. We also note that the two themes were channeled somewhat differently. Foreign radio appears to have played a slightly more important role in bringing the Russian people news about the new President than in conveying reports about the assassination. The reader will recall that the Radio Liberty message schedule gave far less relative emphasis to the presidential succession theme than either the BBC or VOA schedule (Figure 7.1). Therefore, the results summarized in Table 7.11 probably reflect the fact, demonstrated in Chapter VI, that both VOA and the BBC had greater "throughput" or

Table 7.11--Percentage of total exposures to individual Kennedy assassination themes after twenty-four hours of the scenario.*

Theme	Soviet Newspapers	Soviet Radio	Soviet Television	Foreign Radio	Total
1. The assassination of President Kennedy	0.0%	66.3%	7.7%	26.0%	100%
2. The swearing-in of Johnson as President	0.0%	58.8%	6.5%	34.7%	100%

*Exposure outcomes for themes 3 and 4 are not shown for reasons discussed in the footnote to Table 7.8. Also not shown are the exposure outcomes for media type 5, the Soviet oral agitation network, because we did not specify any messages in this media type during the first time period.

messages/exposures ratios than Radio Liberty during the period encompassed by the simulation.

The final exhibit, Table 7.12, shows, for each dimension level of the simulated Soviet population, and for each media type, the cumulative and repeat exposure to the two themes we have been discussing, at the end of one time period. There are several interesting aspects to these data. First, we note that the portion of the table showing cumulative and repeat exposure by media type for the population as a whole reveals virtually the same pattern of differences across media types after one time period that was observed in Table 7.11, which listed total theme exposures by media type for the population as a whole. The pattern may be summarized as follows: Soviet domestic radio the most important single channel for each theme; foreign radio an important second source; Soviet television a weak third in importance, followed by the domestic press which carried no related messages at all during the first time period. These cumulative and repeat exposure outcomes for the end of the first day also serve to further underline the key role played by Soviet domestic radio as the first media source of assassination news for most Russians. During the initial seven hours after President Kennedy's death, Soviet radio easily accounted for the largest single percentage of the population exposed at least once to each of themes 1 and 2. Reflecting the importance of foreign radio is the fact that, for the theme of Johnson's swearing-in, repeat exposure is greater via this medium than via domestic radio.

Table 7.12--Cumulative and repeat exposure of selected subgroups of the simulated Soviet population to individual Kennedy assassination themes, via each media type, after twenty-four hours of the scenario.[a]

Theme	Total Population	Sex		Age			Education				Pol. Involvement		Residence	
		Male	Female	16-29	30-49	50+	<4	≥4,<7	≥7,≤10	>10	Party	NonParty	Urban	Rural
Soviet Newspapers														
1. The assassination of President Kennedy	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
2. The swearing-in of Johnson as President	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
Soviet Radio														
1. The assassination of President Kennedy	35.2 (3.2)	37.6 (2.6)	33.4 (3.7)	32.0 (3.3)	34.0 (3.5)	41.1 (2.7)	33.5 (3.3)	39.1 (3.1)	35.5 (3.3)	19.6 (3.0)	23.5 (1.4)	35.9 (3.3)	35.2 (2.8)	35.2 (3.6)
2. The swearing-in of Johnson as President	22.3 (1.8)	22.1 (1.6)	22.5 (1.9)	20.4 (1.9)	22.8 (1.9)	24.4 (1.6)	21.0 (1.9)	24.8 (1.7)	22.8 (1.8)	12.7 (1.6)	12.5 (0.9)	22.9 (1.8)	21.2 (1.7)	23.5 (1.9)
Soviet Television														
1. The assassination of President Kennedy	10.6 (1.3)	7.1 (1.1)	12.9 (1.3)	8.7 (1.2)	14.3 (1.3)	7.6 (1.3)	8.0 (1.3)	13.8 (1.3)	10.6 (1.3)	5.9 (1.4)	10.3 (1.3)	10.5 (1.3)	17.2 (1.3)	3.7 (1.1)
2. The swearing-in of Johnson as President	4.2 (1.0)	2.4 (1.0)	5.6 (1.0)	3.2 (1.0)	6.0 (1.0)	3.3 (1.0)	3.3 (1.0)	5.4 (1.1)	4.5 (1.0)	2.0 (1.2)	2.9 (1.4)	4.3 (1.0)	7.3 (1.0)	1.2 (1.1)
Foreign Radio														
1. The assassination of President Kennedy	19.8 (2.3)	20.1 (2.4)	19.6 (2.3)	32.1 (2.2)	14.2 (2.4)	10.9 (2.5)	8.3 (1.8)	24.9 (2.2)	20.6 (2.2)	69.6 (3.2)	29.4 (1.3)	19.3 (2.4)	20.5 (2.4)	19.1 (2.3)
2. The swearing-in of Johnson as President	11.3 (2.1)	10.6 (2.4)	11.1 (2.1)	18.8 (2.0)	7.8 (2.3)	6.0 (2.2)	3.5 (1.8)	14.1 (2.0)	11.1 (2.1)	55.9 (2.5)	19.1 (1.2)	10.9 (2.2)	12.7 (2.1)	9.9 (2.1)

Table 7.12--Continued

[a]Exposure outcomes for themes 3 and 4 are not shown for reasons discussed in the footnote to Table 7.8. For each theme, the data in Table 7.12 underestimate repeat exposure (average number of exposures per person among those exposed at least once), especially in the subgroups with greatest exposure (see Chapter VI, pp.   for details). Also not shown are exposure outcomes for media type 5, the Soviet oral agitation network, because we did not specify any messages in this media type during the first time period.

[b]Cumulative percentage exposed at least once.

[c]Average number of exposures per person among those exposed at least once.

Also worthy of note in Table 7.12 are the patterns of exposure difference via media type along the "age" and "education" dimensions. In the case of foreign radio we observe that exposure decreases with age and increases with education, just as it did in the Cuban crisis results. This pattern is quite pronounced, and it accounts for the differential impact of foreign radio in bringing news of the Kennedy assassination to various strata of the Soviet population. For Soviet electronic media, however, the patterns are different. Radio exposure apparently increased with age, with the medium primarily serving those in the lower three education groupings. Television, on the other hand, appears to have been of greater relative importance to the middle aged and to persons in the middle two education groupings. These outcomes closely parallel the findings in Chapter VI and are consistent with the results of studies of Soviet communications behavior either cited or reviewed earlier in this thesis.

Table 7.12 reveals that males were slightly more exposed to news about the Kennedy assassination via foreign radio than females, while the latter were somewhat more heavily exposed via Soviet electronic media. It is also interesting to note that Party members were more heavily exposed to news about the assassination and related events via foreign radio than were non-Party members. The latter, on the other hand, were somewhat more heavily exposed via Soviet radio and television. These are the same exposure differences as observed in the Cuban crisis outcomes, and they reflect, for the most part, the greater average years of schooling among males and Party members.

Lastly, we observe a rather interesting pattern of variation along the dimension of "residence." Urbanites appear to have been more heavily exposed than rural residents to news about the assassination via foreign radio and domestic television, but rural persons apparently were somewhat more exposed by domestic radio. In the Cuban crisis outcomes, however, urbanites were more heavily exposed than ruralites via all media types. This difference may reflect the fact that television was growing in importance between 1962 and 1963 far more rapidly in urban than in rural areas, and that growth may have diminished the urban role of radio somewhat in the time spanned by our two scenarios.

The simulation results for the Kennedy assassination which we have been discussing are equally as plausible as the simulation outcomes for the Cuban crisis. They highlight the important role played by Soviet domestic radio and also by foreign radio in bringing the Russian people news about the assassination of President Kennedy during the first few hours after it had occurred. They also underscore the primacy of domestic radio as the first source of mass media information about the assassination for most Russians, and illustrate the greater rapidity and depth with which assassination themes penetrate the youthful, educated, elite strata of Soviet society. Finally, the simulation results discussed in this chapter also show that foreign radio functioned as a more significant source of information about the President's assassination for young and well-educated

Soviet citizens than for the broader masses of the population, which were served chiefly by domestic radio and television during this period. These results and the findings presented in the previous chapter are consistent with available information on the major characteristics of the Soviet mass media system in the early part of the past decade.

Some Concluding Observations

One does research and writes a thesis to learn something. Accordingly, we close with a brief discussion of the principal lessons learned from this thesis experience, commenting in turn upon the mass media data structures that were mapped into computer storage, the crisis-exposure outcomes which the model produced, and a challenging aspect of interdisciplinary research.

As regards the data structures that were mapped into computer storage, probably the most important lesson to be drawn is the value of parsimony. In large-scale simulation efforts it is easy to forget this amid the complexities of the computer model and the details of the behavioral system on which the model is being tested. This is especially true when the researcher has participated in the design and specification of the model, and is eager to play out all of its implications and consequences. Our own experience has shown how important it is to represent in the computer only those features of the real world system which are likely to affect the simulation outcomes. For example, the greater the number of media, the broader the scope of the content analysis required; the more population dimensions, the greater the number of audience types whose media habits have to be taken into account, and so forth.

The most interesting and significant simulation results are those which show foreign radio as having played a major role in exposing the Russian people to the Western version of Cuban crisis events and to news of President Kennedy's assassination. Neither Inkeles' and Bauer's study of Soviet society, nor Barghoorn's country study, nor any other standard texts on the USSR of which we are aware, attribute this much importance to foreign radio in the early 1960's. To be sure, the average audiences which were estimated for individual foreign radio media were somewhat inflated, as explained in the text. Plans are underway to rerun the simulation with sharply reduced estimates for foreign radio listening, and the results will provide and important check on our own findings.

Also of interest are the simulation outcomes which show very little difference between urban and rural exposure to foreign radio during the two crisis scenarios. In light of the heavy urban concentration of radio sets with short wave reception capability in the early 1960's, this result adds support to a contention frequently made by foreign broadcasters, but heretofore unsubstantiated--viz., that Soviet jamming is much less effective in rural than in urban areas.

Finally, the design, development and application of the Comcom simulation model have brought home to us a basic problem of interdisciplinary research. For this thesis we relied, at different times, on the expertise of the computer programmer, the communications theorist, and the Sovietologist. Frequently, the technical advice and assistance we were able to obtain from such scholars was extremely helpful; occasionally it was not. Problems arose when the experts disagreed. The question might be how best to design a subroutine, what to regard as a reasonable subscription rate for a newspaper, how to model an upsurge of interest in the mass media. In virtually every situation where the experts disagreed, a high level of uncertainty attached to the issue at hand. The moral soon became clear. The interdisciplinary social researcher who is working on a problem of any complexity must inevitably arrive at the point where a strategic decision is required for which the eclectic approach provides no answer. In such cases he has to supply an answer, based perhaps on his own conceptualization of the problem or on some kind of statistical estimate, but at other times based on little more than a working hypothesis or assumption. Part of the excitement of interdisciplinary social research lies in exploring the effects and consequences of such judgements. For this purpose simulation is invaluable.

APPENDIX A

Estimated Format Factors For Each Simulated Soviet Medium

Table A.1--Estimated format factors for the simulated Soviet print media.

Title or Type	Readership Marginals* Education		Political Involvement		Education-Political Involvement Marginals		Speech $\bar{P}$	Speech Format Factor	Long Article or Commentary $\bar{P}$	Long Article or Commentary Format Factor	Announcement $\bar{P}$	Announcement Format Factor	Editorial $\bar{P}$	Editorial Format Factor	Short News Item $\bar{P}$	Short News Item Format Factor	Photo $\bar{P}$	Photo Format Factor	Cartoon $\bar{P}$	Cartoon Format Factor	Letter $\bar{P}$	Letter Format Factor	Slogan $\bar{P}$	Slogan Format Factor
Pravda	>10	.194	Party Member	.174	Hi-Hi	.165	.408		.706		.600		.706		.380		.375		.143		.380			
					Hi-Lo	.029	.509	.325	.457	.435	.408	.330	.457	.435	.273	.214	.034	.088	.030	.137	.273	.214		.685
	≤10	.806	Non Party Member	.826	Lo-Hi	.120	.400		.450		.400		.450		.270		.030		.030		.270			
					Lo-Lo	.686	.284		.368		.250		.368		.164		.030		.158		.164			
Izvestia	>10	.101	Party Member	.117	Hi-Hi	.085	.408		.706		.600		.706		.380		.375		.143		.380			
					Hi-Lo	.016	.509	.314	.457	.409	.408	.302	.457	.409	.273	.197	.034	.059	.030	.137	.273	.197		.645
	≤10	.899	Non Party Member	.883	Lo-Hi	.135	.400		.450		.400		.450		.270		.030		.030		.270			
					Lo-Lo	.764	.284		.368		.250		.368		.164		.030		.158		.164			
Trud	>10	.050	Party Member	.080	Hi-Hi	.042	.408		.706		.600		.706		.380		.375		.143		.380			
					Hi-Lo	.008	.509	.307	.457	.395	.408	.287	.457	.395	.273	.189	.034	.044	.030	.138	.273	.189		.622
	≤10	.950	Non Party Member		Lo-Hi	.142	.400		.450		.400		.450		.270		.030		.030		.270			
					Lo-Lo	.808	.284		.368		.250		.368		.164		.030		.158		.164			
Komsomolskaya pravda	>10	.194	Party Member	.113	Hi-Hi	.165	.408		.706		.600		.706		.380		.375		.143		.380			
					Hi-Lo	.029	.509	.325	.457	.435	.408	.330	.457	.435	.273	.214	.034	.088	.030	.137	.273	.214		.685
	≤10	.806	Non Party Member	.887	Lo-Hi	.120	.400		.450		.400		.450		.270		.030		.030		.270			
					Lo-Lo	.686	.284		.368		.250		.368		.164		.030		.158		.164			
Literaturnaya gazeta	>10	.286	Party Member	.087	Hi-Hi	.243	.408		.706		.600		.706		.380		.375		.143		.380			
					Hi-Lo	.043	.509	.336	.457	.462	.408	.359	.457	.462	.273	.233	.034	.127	.030	.135	.273	.233		.728
	≤10	.714	Non Party Member		Lo-Hi	.107	.400		.450		.400		.450		.270		.030		.030		.270			
					Lo-Lo	.607	.284		.368		.250		.368		.164		.030		.158		.169			

Table A.1--Continued

Title or Type	Readership Marginals*				Education-Political Involvement Marginals		Speech		Long Article or Commentary		Announcement		Editorial		Short News Item		Photo		Cartoon		Letter		Slogan	
	Education		Political Involvement				$\bar{P}$	Format Factor	$\bar{P}$	Format Factor	$\bar{P}$	Format Factor	$\bar{P}$	Format Factor	$\bar{P}$	Format Factor	$\bar{P}$	Format Factor	$\bar{P}$	Format Factor	$\bar{P}$	Format Factor	$\bar{P}$	Format Factor
Ekonomicheskaya gazeta	>10 ≤10	.194 .806	Party Member Non Party Member	.150 .850	Hi-Hi Hi-Lo Lo-Hi Lo-Lo	.165 .029 .120 .686	.408 .509 .400 .284	.325	.706 .457 .450 .368	.435	.600 .408 .400 .250	.330	.706 .457 .450 .368	.435	.380 .273 .270 .164	.214	.375 .034 .030 .030	.088	.143 .030 .030 .158	.137	.380 .273 .270 .164	.214		.685
Selskaya zhizn	>10 ≤10	.050 .950	Party Member Non Party Member	.060 .940	Hi-Hi Hi-Lo Lo-Hi Lo-Lo	.042 .008 .142 .808	.408 .509 .400 .284	.307	.706 .457 .450 .368	.395	.600 .408 .400 .250	.287	.706 .457 .450 .368	.395	.380 .273 .270 .164	.189	.375 .034 .030 .030	.044	.143 .030 .030 .158	.138	.380 .273 .270 .164	.189		.622
Nedelya	>10 ≤10	.101 .899	Party Member Non Party Member	.117 .883	Hi-Hi Hi-Lo Lo-Hi Lo-Lo	.085 .016 .135 .764	.408 .509 .400 .284	.314	.706 .457 .450 .368	.409	.600 .408 .400 .250	.302	.706 .457 .450 .368	.409	.380 .273 .270 .164	.197	.375 .034 .030 .030	.059	.143 .030 .030 .158	.137	.380 .273 .270 .164	.197		.645
Krasnaya zvezda	>10 ≤10	.250 .750	Party Member Non Party Member	.900 .100	Hi-Hi Hi-Lo Lo-Hi Lo-Lo	.212 .038 .112 .638	.408 .509 .440 .284	.334	.706 .457 .450 .368	.452	.600 .408 .400 .250	.346	.706 .457 .450 .368	.452	.380 .273 .270 .164	.103	.375 .034 .030 .030	.103	.143 .030 .030 .158	.134	.380 .273 .270 .164	.226		.712
Sovietskaya Rossia	>10 ≤10	.009 .991	Party Member Non Party Member	.025 .975	Hi-Hi Hi-Lo Lo-Hi Lo-Lo	.008 .001 .149 .842	.408 .509 .400 .284	.302	.706 .457 .450 .368	.383	.600 .408 .400 .250	.275	.706 .457 .450 .368	.383	.380 .273 .270 .164	.181	.375 .034 .030 .030	.033	.143 .030 .030 .030	.139	.380 .273 .270 .164	.181		.603

Table A.1--Continued

Title or Type	Readership Marginals* Education		Political Involvement		Education-Political Involvement Marginals		Speech $\bar{P}$	Speech Format Factor	Long Article or Commentary $\bar{P}$	Long Article or Commentary Format Factor	Announcement $\bar{P}$	Announcement Format Factor	Editorial $\bar{P}$	Editorial Format Factor	Short News Item P	Short News Item Format Factor	Photo $\bar{P}$	Photo Format Factor	Cartoon $\bar{P}$	Cartoon Format Factor	Letter $\bar{P}$	Letter Format Factor	Slogan $\bar{P}$	Slogan Format Factor
Kazakhstan Party-Govt. Papers	>10	.007	Party Member	.020	Hi-Hi	.006	.408	.302	.706	.381	.600	.275	.706	.381	.380	.181	.375	.031	.143	.143	.380	.181		.600
	≤10	.993	Non Party Member	.980	Hi-Lo	.001	.509		.457		.408		.457		.273		.034		.030		.273			
					Lo-Hi	.149	.400		.450		.400		.450		.270		.030		.030		.270			
					Lo-Lo	.844	.284		.368		.250		.368		.164		.030		.030		.164			
Central Asian Party-Govt. Papers	>10	.006	Party Member	.014	Hi-Hi	.005	.408	.302	.706	.381	.600	.275	.706	.381	.380	.181	.375	.031	.143	.143	.380	.181		.600
	≤10	.994	Non Party Member	.986	Hi-Lo	.001	.509		.457		.408		.457		.273		.034		.030		.273			
					Lo-Hi	.149	.400		.450		.400		.450		.270		.030		.030		.270			
					Lo-Lo	.845	.284		.368		.250		.368		.164		.030		.158		.164			
Transcaucasian Party-Govt. Papers	>10	.012	Party Member	.023	Hi-Hi	.010	.408	.302	.706	.384	.600	.276	.706	.384	.380	.183	.375	.033	.143	.138	.380	.183		.605
	≤10	.988	Non Party Member	.977	Hi-Lo	.002	.509		.457		.408		.457		.273		.034		.030		.273			
					Lo-Hi	.148	.400		.450		.400		.450		.270		.030		.030		.270			
					Lo-Lo	.840	.284		.368		.250		.368		.164		.030		.158		.164			
Baltic Party-Govt. Papers	>10	.009	Party Member	.009	Hi-Hi	.008	.408	.303	.706	.383	.600	.275	.706	.383	.380	.185	.375	.032	.143	.138	.380	.185		.603
	≤10	.991	Non Party Member	.991	Hi-Lo	.001	.509		.457		.408		.457		.273		.034		.030		.273			
					Lo-Hi	.149	.400		.450		.400		.450		.270		.030		.030		.270			
					Lo-Lo	.842	.284		.368		.250		.368		.164		.030		.158		.164			
European Party-Govt. Papers	>10	.009	Party Member	.001	Hi-Hi	.008	.408	.303	.706	.383	.600	.275	.706	.383	.380	.185	.375	.032	.143	.138	.380	.185		.603
	≤10	.991	Non Party Member	.999	Hi-Lo	.001	.509		.457		.408		.457		.273		.034		.030		.273			
					Lo-Hi	.149	.400		.450		.400		.450		.270		.030		.030		.270			
					Lo-Lo	.842	.284		.368		.250		.368		.164		.030		.158		.164			

Table A.1--Continued

Title or Type	Readership Marginals* Education		Political Involvement		Education-Political Involvement Marginals		Speech $\bar{P}$	Speech Format Factor	Long Article or Commentary $\bar{P}$	Long Article or Commentary Format Factor	Announcement $\bar{P}$	Announcement Format Factor	Editorial $\bar{P}$	Editorial Format Factor	Short News Item $\bar{P}$	Short News Item Format Factor	Photo $\bar{P}$	Photo Format Factor	Cartoon $\bar{P}$	Cartoon Format Factor	Letter $\bar{P}$	Letter Format Factor	Slogan $\bar{P}$	Slogan Format Factor
All Republic Komsomol Papers Published 5 Per Week	>10 ≤10	.002 .998	Party Member Non Party Member	.010 .990	Hi-Hi Hi-Lo Lo-Hi Lo-Lo	.0017 .0003 .150 .848	.408 .509 .400 .284	.301	.706 .457 .450 .368	.381	.600 .408 .400 .250	.273	.706 .457 .450 .368	.381	.380 .273 .270 .164	.180	.375 .034 .030 .030	.030	.143 .030 .030 .158	.138	.380 .273 .270 .164	.180		.600
All Republic Komsomol Papers Published 3 Per Week	>10 ≤10	.002 .998	Party Member Non Party Member	.010 .990	Hi-Hi Hi-Lo Lo-Hi Lo-Lo	.0017 .0003 .150 .848	.408 .509 .400 .284	.301	.706 .457 .450 .368	.381	.600 .408 .400 .250	.273	.706 .457 .450 .368	.381	.380 .273 .270 .164	.180	.375 .034 .030 .030	.030	.143 .030 .030 .158	.138	.380 .273 .270 .164	.180		.600
All SubRepublic Komsomol Papers Published 3 Per Week	>10 ≤10	.020 .980	Party Member Non Party Member	.017 .983	Hi-Hi Hi-Lo Lo-Hi Lo-Lo	.017 .003 .147 .833	.408 .509 .400 .284	.304	.706 .457 .450 .368	.385	.600 .408 .400 .250	.279	.706 .457 .450 .368	.385	.380 .273 .270 .164	.183	.375 .034 .030 .030	.035	.143 .030 .030 .158	.138	.380 .273 .270 .164	.183		.606
Other All-Union Published 3 Per Week	>10 ≤10	.227 .773	Party Member Non Party Member	.131 .869	Hi-Hi Hi-Lo Lo-Hi Lo-Lo	.193 .034 .116 .657	.408 .509 .400 .284	.329	.706 .457 .450 .368	.446	.600 .408 .400 .250	.340	.706 .457 .450 .368	.446	.380 .273 .270 .164	.221	.375 .034 .030 .030	.096	.143 .030 .030 .157	.136	.380 .273 .270 .164	.221		.702
Other All-Union Published 2 Per Week	>10 ≤10	.227 .773	Party Member Non Party Member	.131 .869	Hi-Hi Hi-Lo Lo-Hi Lo-Lo	.193 .034 .116 .657	.408 .509 .400 .284	.329	.706 .457 .450 .368	.446	.600 .408 .400 .250	.340	.706 .457 .450 .368	.446	.380 .273 .270 .164	.221	.375 .034 .030 .030	.096	.143 .030 .030 .158	.136	.380 .273 .270 .164	.221		.702

Table A.1--Continued

Title or Type	Readership Marginals*: Education		Readership Marginals*: Political Involvement		Education-Political Involvement Marginals		Speech $\bar{P}$	Speech Format Factor	Long Article or Commentary $\bar{P}$	Long Article or Commentary Format Factor	Announcement $\bar{P}$	Announcement Format Factor	Editorial $\bar{P}$	Editorial Format Factor	Short News Item $\bar{P}$	Short News Item Format Factor	Photo $\bar{P}$	Photo Format Factor	Cartoon $\bar{P}$	Cartoon Format Factor	Letter $\bar{P}$	Letter Format Factor	Slogan $\bar{P}$	Slogan Format Factor
Other Republic Papers Published 5 Per Week	>10 ≤10	.009 .991	Party Member Non Party Member	.020 .980	Hi-Hi Hi-Lo Lo-Hi Lo-Lo	.008 .001 .149 .842	.408 .509 .400 .284	.303	.706 .457 .450 .368	.383	.600 .408 .400 .250	.275	.706 .457 .450 .368	.383	.380 .273 .270 .164	.185	.375 .034 .030 .030	.032	.143 .030 .030 .158	.138	.380 .273 .270 .164	.185		.603
Other Republic Papers Published 3 Per Week	>10 ≤	.009 .991	Party Member Non Party Member	.020 .980	Hi-Hi Hi-Lo Lo-Hi Lo-Lo	.008 .001 .149 .842	.408 .509 .400 .284	.303	.706 .457 .450 .368	.383	.600 .408 .400 .250	.275	.706 .457 .450 .368	.383	.380 .273 .270 .164	.185	.375 .034 .030 .030	.032	.143 .030 .030 .158	.138	.380 .273 .270 .164	.185		.603
Other Republic Papers Published 2 Per Week	>10 ≤	.009 .991	Party Member Non Party Member	.020 .980	Hi-Hi Hi-Lo Lo-Hi Lo-Lo	.008 .001 .149 .842	.408 .509 .400 .284	.303	.706 .457 .450 .368	.383	.600 .408 .400 .250	.275	.706 .457 .450 .368	.383	.380 .273 .270 .164	.185	.375 .034 .030 .030	.032	.143 .030 .030 .158	.138	.380 .273 .270 .164	.185		.603
Other Republic Papers Published 1 Per Week	>10 ≤10	.009 .991	Party Member Non Party Member	.020 .980	Hi-Hi Hi-Lo Lo-Hi Lo-Lo	.008 .001 .149 .842	.408 .509 .400 .284	.303	.706 .457 .450 .368	.383	.600 .408 .400 .250	.275	.706 .457 .450 .368	.3M3	.380 .273 .270 .164	.185	.375 .034 .030 .030	.032	.143 .030 .030 .158	.138	.380 .273 .270 .164	.185		.603
Other SubRepublic Papers Published 6 Per Week	>10 ≤10	.091 .909	Party Member Non Party Member	.035 .965	Hi-Hi Hi-Lo Lo-Hi Lo-Lo	.077 .014 .136 .773	.408 .509 .400 .284	.312	.706 .457 .450 .368	.405	.600 .408 .400 .250	.299	.706 .457 .450 .368	.405	.380 .273 .270 .164	.197	.375 .034 .030 .030	.056	.143 .030 .030 .158	.137	.380 .273 .270 .164	.197		.638

Table A.1--Continued

Title or Type	Readership Marginals* Education		Political Involvement		Education-Political Involvement Marginals		Speech $\bar{P}$	Speech Format Factor	Long Article or Commentary $\bar{P}$	Long Article or Commentary Format Factor	Announcement $\bar{P}$	Announcement Format Factor	Editorial $\bar{P}$	Editorial Format Factor	Short News Item $\bar{P}$	Short News Item Format Factor	Photo $\bar{P}$	Photo Format Factor	Cartoon $\bar{P}$	Cartoon Format Factor	Letter $\bar{P}$	Letter Format Factor	Slogan $\bar{P}$	Slogan Format Factor
Other SubRepublic Papers Published 5 Per Week	>10 ≤10	.091 .909	Party Member Non Party Member	.035 .965	Hi-Hi Hi-Lo Lo-Hi Lo-Lo	.077 .014 .136 .773	.408 .509 .400 .284	.312	.706 .457 .450 .368	.405	.600 .408 .400 .250	.299	.706 .457 .450 .368	.405	.380 .273 .270 .164	.197	.375 .034 .030 .030	.056	.143 .030 .030 .158	.137	.380 .273 .270 .164	.197		.638
Other SubRepublic Papers Published 4 Per Week	>10 ≤10	.091 .909	Party Member Non Party Member	.035 .965	Hi-Hi Hi-Lo Lo-Hi Lo-Lo	.077 .014 .136 .773	.408 .509 .400 .284	.312	.706 .457 .450 .368	.405	.600 .408 .400 .250	.299	.706 .457 .450 .368	.405	.380 .273 .270 .164	.197	.375 .034 .030 .030	.056	.143 .030 .030 .158	.137	.380 .273 .270 .164	.197		.638
Other SubRepublic Papers Published 3 Per Week	>10 ≤10	.091 .909	Party Member Non Party Member	.035 .965	Hi-Hi Hi-Lo Lo-Hi Lo-Lo	.077 .014 .136 .773	.408 .509 .400 .284	.312	.706 .457 .450 .368	.405	.600 .408 .400 .250	.299	.706 .457 .450 .368	.405	.380 .273 .270 .164	.197	.375 .034 .030 .030	.056	.143 .030 .030 .158	.137	.380 .273 .270 .164	.197		.638
Other SubRepublic Papers Published 2 Per Week	>10 ≤10	.091 .909	Party Member Non Party Member	.035 .965	Hi-Hi Hi-Lo Lo-Hi Lo-Lo	.077 .014 .136 .773	.408 .509 .400 .284	.312	.706 .457 .450 .368	.405	.600 .408 .400 .250	.299	.706 .457 .450 .368	.405	.380 .273 .270 .164	.197	.375 .034 .030 .030	.056	.143 .030 .030 .158	.137	.380 .273 .270 .164	.197		.638
Other SubRepublic Papers Published 1 Per Week	>10 ≤10	.091 .909	Party Member Non Party Member	.035 .965	Hi-Hi Hi-Lo Lo-Hi Lo-Lo	.077 .014 .136 .773	.408 .509 .400 .284	.312	.706 .457 .450 .368	.405	.600 .408 .400 .250	.299	.706 .457 .450 .368	.405	.380 .273 .270 .164	.197	.375 .034 .030 .030	.056	.143 .030 .030 .158	.137	.380 .273 .270 .164	.197		.638

Table A.1--Continued

Title or Type	Readership Marginals*				Education-Political Involvement Marginals		Speech		Long Article or Commentary		Announcement		Editorial		Short News Item		Photo		Cartoon		Letter		Slogan	
	Education		Political Involvement				$\bar{P}$	Format Factor	$\bar{P}$	Format Factor	$\bar{P}$	Format Factor	$\bar{P}$	Format Factor	$\bar{P}$	Format Factor	$\bar{P}$	Format Factor	$\bar{P}$	Format Factor	$\bar{P}$	Format Factor	$\bar{P}$	Format Factor
Ogonyok	>10	.047	Party Member	.018	Hi-Hi	.040	.408		.706		.600		.706		.380		.375		.143		.380			
	≤10	.953	Non Party Member	.982	Hi-Lo	.007	.509		.457		.408		.457		.273		.034		.030		.273			
					Lo-Hi	.143	.400	.307	.450	.393	.400	.286	.450	.393	.270	.189	.030	.043	.030	.138	.270	.189		--
					Lo-Lo	.810	.284		.368		.250		.368		.164		.030		.158		.164			
Krokodil	>10	.088	Party Member	.065	Hi-Hi	.075	.408		.706		.600		.706		.380		.375		.143		.380			
	≤10	.912	Non Party Member	.935	Hi-Lo	.013	.509		.457		.408		.457		.273		.034		.030		.273			
					Lo-Hi	.137	.400	.313	.450	.406	.400	.299	.450	.406	.270	.196	.030	.055	.030	.137	.270	.196		--
					Lo-Lo	.775	.284		.368		.250		.368		.164		.030		.158		.164			

*These are just the education and political involvement marginals mapped into computer storage in Pass I. The education-political involvement marginals were estimated by assuming that approximately 85% of those with more than 10 years of education and 15% of those with less than 10 years of education were highly politically involved. Each format factor was then computed as the sum of products of the given print medium's education-political involvement marginals and the estimated average format factors for the given type of article in the three education-political involvement categories.

Table A.2--Estimated format factors for the simulated Soviet electronic media.

Medium	Audience Educational Marginals[1]		Average Format Factor[2]	Program Factors[3]				Final Format Factors for Newscasts[4]								
				I	II	IV	Regional		I	(N)	II	(N)	IV	(N)	Regional	(N)
Early morning central radio (5:30-8:29 a.m.)	>10	.040	.893	.60	.30	.10	-	Mon.→Fri.	.400	(4)	.255	(2)	.067	(4)		
	>7, ≤10	.315						Sat.	.465	(3)			.077	(3)		
	≤7	.645						Sun.	.465	(3)			.077	(3)		
Midmorning radio (8:30-11:59 a.m.)	>10	.065	.890	.37	.19	.07	.37	Mon.→Fri.	.286	(3)	.158	(2)	.054	(3)	.029	(2)
	>7, ≤10	.353						Sat.	.314	(2)	.158	(2)	.059	(2)	.029	(2)
	≤7	.582						Sun.	.314	(2)	.169	(1)	.059	(2)	.030	(1)
Lunchtime central radio (noon-2:59 p.m.)	>10	.019	.898	.60	.30	.10	-	Mon.→Fri.	.471	(3)	.269	(1)	.057	(5)		
	>7, ≤10	.256						Sat.	.516	(2)	.269	(1)	.079	(3)		
	≤7	.725						Sun.	.516	(2)	.269	(1)	.068	(4)		
Afternoon radio (3:00-5:59 p.m.)	>10	.065	.890	.37	.19	.07	.37	Mon.→Fri.	.208	(5)			.054	(3)		
	>7, ≤10	.353						Sat.	.247	(4)			.059	(2)		
	≤7	.582						Sun.	.247	(4)			.059	(2)		
Early evening central radio (6:00-9:29 p.m.)	>10	.033	.896	.60	.30	.10	-	Mon.→Fri.	.341	(5)	.258	(2)	.057	(5)		
	>7, ≤10	.275						Sat.	.403	(4)	.258	(2)	.067	(4)		
	≤7	.692						Sun.	.403	(4)	.258	(2)	.067	(4)		
Late evening central radio (9:30 p.m.-5:29 a.m.)	>10	.029	.895	.60	.30	.10	-	Mon.→Fri.	.400	(4)	.268	(1)	.036	(8)		
	>7, ≤10	.283						Sat.	.400	(4)	.268	(1)	.057	(5)		
	≤7	.688						Sun.	.400	(4)	.268	(1)	.057	(5)		
Early morning regional radio (5:30-8:29 a.m.)	>10	.020	.897	-	-	-	1.00	Mon.→Fri.							.078	(2)
	>7, ≤10	.260														
	≤7	.720														
Lunchtime regional radio (noon-2:59 p.m.)	>10	.082	.888	-	-	-	1.00	Mon.→Fri.							.081	(1)
	>7, ≤10	.347						Sat.							.081	(1)
	≤7	.571						Sun.							.081	(1)

Table A.2--Continued

Medium	Audience Educational Marginals[1]		Average Format Factor[2]	Program Factors[3] I	II	IV	Regional	Final Format Factors for Newscasts[4]	I	(N)	II	(N)	IV	(N)	Regional		(N)
Early evening	>10	.045													Mon. → Fri.	.077	(2)
regional radio	>7, ≤10	.310	.893	-	-	-	1.00								Sat.	.077	(2)
(6:00-9:29 p.m.)	≤7	.645													Sun.	.077	(2)
Late evening	>10	.055													Mon. → Fri.	.081	(1)
regional radio	>7, ≤10	.244	.894	-	-	-	1.00								Sat.	.081	(1)
(9:30 p.m.-5:29 a.m.)	≤7	.701													Sun.	.081	(1)
Daytime	>10	.040						Mon.									
central television	>7, ≤10	.353	.523	.80	.20	-	-	Tu. → Fri.									
(11:00 a.m.-5:59 p.m.)	≤7	.607						Sat.									
								Sun.									
Nighttime central	>10	.049						Mon.	.284	(1)	.102	(2)	-				
television	>7, ≤10	.225	.508	.80	.20	-	-	Tu. → Fri.	.284	(1)	.102	(2)	-				
(6:00 p.m.-midnight)	≤7	.726						Sat.	.284	(1)	.102	(2)	-				
								Sun.	.284	(1)	.102	(2)	-				
Daytime	>10	.065															
regional television	>7, ≤10	.353	.516	-	-	-	1.00										
(11:00 a.m.-5:59 p.m.)	≤7	.582															
Nighttime	>10	.040													Mon.	.047	(1)
regional television	>7, ≤10	.339	.521	-	-	-	1.00								Tu. → Fri.	.040	(2)
(6:00 p.m.-midnight)	≤7	.621													Sat.	.040	(2)
															Sun.	.047	(1)

Table A.2--Continued

[1]These are just the marginals mapped into computer audiences in Pass I, after the ≥ 7, ≤ 10 category had been converted (linearly) to >7, ≤ 10 and $= 7$.

[2]These estimates were obtained by taking the sum of products of the audience education marginals and the estimated average format factors in the three education categories.

[3]Each format factor was obtained by solving a quadratic equation (see p.   of the text) to estimate a format factor for the given medium-Program combination, and then multiplying the result by the corresponding Program factor (1/11 in the case of regional newscasts).

Table A.3--Estimated format factors for the simulated foreign radio media.

Medium	Aud. Educat.	Marginals[1]	Average Format Factor[2]	Time Slot Factors	Time Slot	Final Format Factors for News Broadcasts[3]: Georgian	N	Armenian	N	Ukrainian	N	Russian	N
Early morning VOA	>10	.380											
	>7, ≤10	.255	.801	1.00	4:00-7:59 a.m.	-	0	-	0	-	0	.740	2
	≤7	.365											
Daytime VOA	>10	.380		0.97	8:00 a.m.-3:59 p.m.	-	0	-	0	-	0	.072	2
	>7, ≤10	.255	.801										
	≤7	.365		.903	4:00-7:59 p.m.	.012	1	.010	1	.143	1	.560	1
Nighttime VOA	>10	.380		.640	8:00-11:59 p.m.	-	0	-	0	-	0	.329	3
	>7, ≤10	.255	.801										
	≤7	.365		.360	midnight-3:59 a.m.	-	0	-	0	.059	1	.212	2

Medium	Aud. Educat.	Marginals	Average Format Factor	Time Slot Factors	Time Slot	Final Format Factors for News Broadcasts[3]: 10 minute	N	90 minute	N	110 minute	N
Early morning BBC	>10	.440									
	>7, ≤10	.225	.807	.100	I	-	0	.807	1	-	0
	≤7	.335									
Daytime BBC	>10	.440		.097	I	-	0	.039	1	.039	1
	>7, ≤10	.225	.807								
	≤7	.335		.903	II	.242	1	.485	1	-	0
Nighttime BBC	>10	.440		.640	I	.172	1	-	0	.344	1
	>7, ≤10	.225	.807								
	≤7	.335		.360	II	-	0	-	0	.290	1

Table A.3--Continued

Medium	Aud.Educat.	Marginals[1]	Average Format Factor[2] (News)	Time Slot Factors	Time Slot	Minsk	N	Moscow	N	Molotov	N	Kiev	N	Kharkov	N	Stalingrad	N	Tibilis	N
						Final Format Factors for News Broadcasts--Part I[3]													
Early morning RL	>10	.360																	
	>7, ≤10	.210	.775	1.00	I	-	0	.082	4	.071	2	.116	2	.065	4	.042	4	-	0
	≤7	.430																	
Daytime RL	>10	.360		.032	I	-	0	.003	2	-	0	-	0	-	0	.002	1	-	0
	>7, ≤10	.210	.775	.065	II	-	0	-	0	-	0	-	0	-	0	-	0	-	0
	≤7	.430		.903	III	-	0	.140	1	-	0	-	0	.150	2	.078	1	-	0
Nighttime RL	>10	.360		.640	I	-	0	.034	4	-	0	-	0	-	0	.027	2	-	0
	>7, ≤10	.210	.775																
	≤7	.430		.360	II	.014	4	.018	4	.024	4	.039	3	.025	4	-	0	.017	1
						Final Format Factors for News Broadcasts--Part II[3]													
Early morning RL	>10	.360																	
	>7, ≤10	.210	.775	1.00	I	.105	2	.082	1	.071	3	.116	1	.065	4	.042	1	-	0
	≤7	.430																	
Daytime RL	>10	.360		.032	I	.003	2	.003	2	.004	1	.004	2	.006	1	.002	2	-	0
	>7, ≤10	.210	.775	.065	II	-	0	-	0	-	0	-	0	-	0	-	0	-	0
	≤7	.430		.903	III	.099	3	.140	1	-	0	.125	3	.150	1	-	0	-	0
Nighttime RL	>10	.360		.640	I	.050	4	.034	4	.072	2	.063	4	.090	3	.027	3	-	0
	>7, ≤10	.210	.775																
	≤7	.430		.360	II	.014	4	.018	4	.024	1	-	0	.025	3	.017	4	-	0

Table A.3--Continued

[1]These are just the marginals mapped into computer audiences in Pass I, after the ≥ 7, ≤ 10 category had been converted (linearly) to >7, ≤ 10 and $= 7$.

[2]These estimates were obtained by taking the sum of products of the audience education marginals and the estimated average format factors in the three education categories.

[3]Each format factor was obtained by solving a quadratic equation (see p.   of the text) to estimate a format factor for the given medium - time slot - language, medium - time slot - newscast length, or medium-time slot - target area combination, and then multiplying the result by (1) the corresponding time slot factor, and (2) the corresponding language, newscast length, or target area factor.

APPENDIX B

Themes, Code Sheets, and Methods of Inference Used in the Content Analyses of Soviet Media and Foreign Radio

APPENDIX B

Themes, Code Sheets, and Methods of Inference Used in the Content Analyses of Soviet Media and Foreign Radio

Themes in the Cuban Missile Crisis

1. The U.S. Naval Quarantine of Cuba

This theme includes any message which reports on the institution of the quarantine. The object is to record all mass media messages which told of the existence of the quarantine during the period encompassed by the simulation, no matter how long after the Kennedy announcement they appeared. For example, a *Pravda* editorial published several days after President Kennedy's speech, commenting on the illegality of the quarantine, while probably not a source from which anyone first learned of the quarantine, would be coded for this theme.

2. Reports of Pro-Soviet or Anti-U.S. Reactions

This theme includes all reports of reactions, both foreign and domestic, favoring Soviet policy or opposing United States actions. Examples of this theme are quotes of American citizens criticizing U.S. policy in regard to Cuba, reports from abroad of demonstrations and rallies or other forms of protest against United States actions, accounts of intransigence and uncooperativeness among American allies, accounts of American-allied, neutral, or Communist countries endorsing the Soviet Union's position during the crisis, congratulatory notes to Khrushchev on his posture during the crisis, opinion polls abroad showing U.S. citizens in opposition to their government's policy, demonstrations within the Soviet Union in support of Soviet policy or against U.S. actions, and foreign or domestic demonstrations of support for Cuba and the Cuban people.

3. Reports of Pro-U.S. or Anti-Soviet Reactions

This theme includes all reports of reactions, both foreign and domestic, opposing Soviet policy or favoring/justifying U.S. actions. In addition to the converse of the examples cited for theme 2, it includes statements in support of the United States from any of the NATO or OAS allies, reports of American claims that the Soviets had installed offensive missiles in Cuba which were a threat to U.S. security, and accounts of aerial reconnaissance photographs taken by the United States of Cuban missile bases.

4. Soviet Allegations of U.S. Hostility Towards Cuba

This theme includes reports of air or sea violations of Cuba's territorial integrity--either by the United States or by Cuban emigrés, reports of subversion or sabotage inside Cuba, accounts of "war hysteria" within the United States, reports of inflammatory Congressional speeches and resolutions, references to provocative articles in American newspapers, accounts of United States efforts to impose an economic blockade upon Cuba--either alone or in conjunction with her allies, descriptions of American moves to mobilize her armed forces, accounts of U.S. naval maneuvers in the Caribbean, complaints about American interference with the transit rights of Cuban-bound non-Soviet ships, allegations regarding American attempts to forge an anti-Cuban bloc among her NATO and OAS allies, and reports of U.S. efforts to create a Cuban government-in-exile.

5. Soviet Agreement to Remove Their Missiles From Cuba

This theme includes all reports of the Soviet agreement to withdraw their missiles from Cuba and dismantle their bases on the island in return for a U.S. no-invasion pledge. It does not include reports of the earlier Soviet offer to swap this withdrawal for the removal of U.S. missiles and bases from Turkey.

6. U.S. Threats Directed Against The Soviets

This theme includes all reports of U.S. statements that warn of possible military action against the Soviets and all reports of U.S. actions that are seen as a threat to Soviet security. An example of the former is President Kennedy's statement to the effect that any missile launched from Cuba against any country in the Western Hemisphere would be viewed as an attack by the Soviet Union on the United States that called for a full retaliatory response by the U.S. against the Soviet Union. An example of the latter is the incident in which a United States aircraft flew over Siberia.

7. Soviet Threats Directed Against the U.S.

This theme includes all reports of Soviet statements that warn of possible military action against the United States and all reports of Soviet actions that signal impending military action against the U.S. An example of the former is the Soviet government's statement that the U.S. would not be allowed to carry out "pirate" actions on the high seas. An example of the latter is the Soviet cancellation of all military leaves.

Themes in the Assassination of President Kennedy

1. The Assassination of President Kennedy

This theme includes any message which refers to the fact that President Kennedy has been assassinated. The object is to record all mass media messages which told of the assassination during the period encompassed by the simulation, no matter how long after Kennedy's death they appeared. For example, a roundtable discussion broadcast over Moscow radio several days after President Kennedy's death, in which the participants allege that violence and corruption in U.S. society were responsible for the President's assassination, while probably not a source from which anyone first learned of the assassination, would be coded for this theme.

2. The Swearing in of Johnson as President

This theme includes all reports making reference, either directly or indirectly, to the fact that Lyndon Johnson has been sworn in as President of the United States. An example of an indirect reference that would be coded for this theme is an *Izvestia* article, published several days after Johnson had taken the oath of office, speculating on the likely degree of continuity between the policies of the Kennedy and Johnson administrations.

3. The Assassination of Oswald

This theme includes all reports that Lee Harvey Oswald has been assassinated. As with the first two themes, it includes tangential as well as direct references, i.e., it includes news items from which Oswald's assassination can be inferred. Stories about Jack Ruby, Oswald's funeral, his life, or his widow will generally fall in the latter category.

4. The Establishment of the Warren Commission

This theme includes all reports that the Warren Commission has been established for the purpose of conducting a comprehensive investigation of the assassination.

Code Sheets Used in the Content Analysis

In this section we present the code sheets (Tables B.1-B.5) used in the content analysis of Soviet media material and foreign radio transmissions to the Soviet Union during the period of the Cuban missile crisis. An identical set of code sheets was used in the content analysis of Soviet media material and radio broadcasts beamed to the U.S.S.R. from abroad after President Kennedy's assassination. (On the latter set of code sheets, of course, the "Day" column ran from November 22nd to December 1st, 1963.)

Table B.1--Code sheet used in the content analysis of Soviet newspapers published during the Cuban missile crisis.[a]

Simulation Time Point	Day (Oct., 1962)	Message Format: Editorial	Short News Item	Cartoon	Announcement	Speech	Telegram or Letter	Slogan	Photograph	Long News Article[b]	Long Commentary[b]
1	23	c									
2	24										
3	25										
4	26										
5	27										
6	28										
8	30										
9	31										
10	1										

[a] In the content analysis of individual Soviet newspapers, a code sheet of this kind was completed for each of the seven themes.

[b] These two formats were treated identically in the assignment of format factors to messages.

[c] A six-cell grid was used to record the page number on which each message appeared, as follows:

1	2	3
4	5	6

. Due to lack of data, however, we were unable to make use of a message's page number in the computation of its format factor.

Table B.2--Code sheet used in the content analysis of Moscow Central Radio broadcasts transmitted during the Cuban missile crisis.[a]

		Time of Day (Moscow Central Time)[b]					
Simulation Time Period	Day (Oct.,1962)	5:30-8:29 a.m.	8:30-11:59 a.m.	Noon-2:59 p.m.	3:00-5:59 p.m.	6:00-9:29 p.m.	9:30 p.m.-5:29 a.m.
1	23						
2	24						
3	25						
4	26						
5	27						
6	28						
7	29						
8	30						
9	31						
10	1						

[a]In the content analysis of Moscow Central Radio broadcasts, a code sheet of this kind was completed for each of the seven themes.

[2]Times of day correspond to the intervals used to define Soviet radio media in the simulation.

Table B.3--Code sheet used to infer the content of Moscow Central Television broadcasts transmitted during the Cuban missile crisis.[a]

Simulation Time Period	Day (Oct.,1962)	Time of Day (Moscow Central Time)					
		5:30-8:29 a.m.	8:30-11:59 a.m.	Noon-2:59 p.m.	3:00-5:59 p.m.	6:00-9:29 p.m.	9:30 p.m.-5:29 a.m.
1	23						
2	24						
3	25						
4	26						
5	27						
6	28						
7	29						
8	30						
9	31						
10	1						

[a]In order to code the content of Moscow Central Television broadcasts for each of the seven themes we used the code sheet that had been completed for Moscow Central radio broadcasts. The reason for this is discussed in footnote b to Table B.13.

Table B.4--Code sheet used in the content analysis of Voice of America broadcasts transmitted to the Soviet Union during the Cuban missile crisis.[a]

Simulation Time Period	Day (Oct.,1962)	Time of Day (In target area)[b]				
		4:00-7:59 a.m.	8:00 a.m.-3:59 p.m.	4:00-7:59 p.m.	8:00-11:59 p.m.	Midnight-3:59 a.m.
1	23	[c]				
2	24					
3	25					
4	26					
5	27					
6	28					
7	29					
8	30					
9	31					
10	1					

[a]In the content analysis of Voice of America broadcasts, a code sheet of this kind was completed for each of the seven themes.

[b]Times of day correspond to the intervals used (1) to define individual VOA media in the simulation and (2) to define, in part, the format factors of messages appearing in each VOA medium.

[c]A four-cell grid was used to record the language in which each message was broadcast, as follows:

Georgian	Armenian
Ukrainian	Russian

. These languages were used to define, in part, the format factors of messages appearing in each simulated VOA medium.

Table B.5--Code sheet used in the content analysis of London Times editions published during the Cuban missile crisis.*

Simulation Time Period	Day (Oct., 1962)	THEME						
		1	2	3	4	5	6	7
1	23							
2	24							
3	25							
4	26							
5	27							
6	28							
7	29							
8	30							
9	31							
10	1							

*In order to code the content of British Broadcasting Corporation transmissions to the Soviet Union for each of the seven themes we content analyzed London Times editions published during the relevant period. The reason for this is discussed in footnote 6 to Table B.19.

Table B.6--Code sheet used in the content analysis of Radio Liberty broadcasts transmitted to the Soviet Union during the Cuban missile crisis.[a]

Simulation Time Period	Day (Oct., 1962)	Time of Day (In Target Area)[b]					
		4:00-7:59 a.m.	8:00-11:59 a.m.	Noon-3:59 p.m.	4:00-7:59 p.m.	8:00-11:59 p.m.	Midnight-3:59 a.m.
1	23	c					
2	24						
3	25						
4	26						
5	27						
6	28						
7	29						
8	30						
9	31						
10	1						

[a]In the content analysis of Radio Liberty broadcasts, a code sheet of this kind was completed for each of the seven themes.

[b]Times of day correspond to the intervals used (1) to define individual RL media in the simulation and (2) to define, in part, the format factors of messages appearing in each RL medium.

[c]An eight-cell grid was used to record the target area of each message as follows:

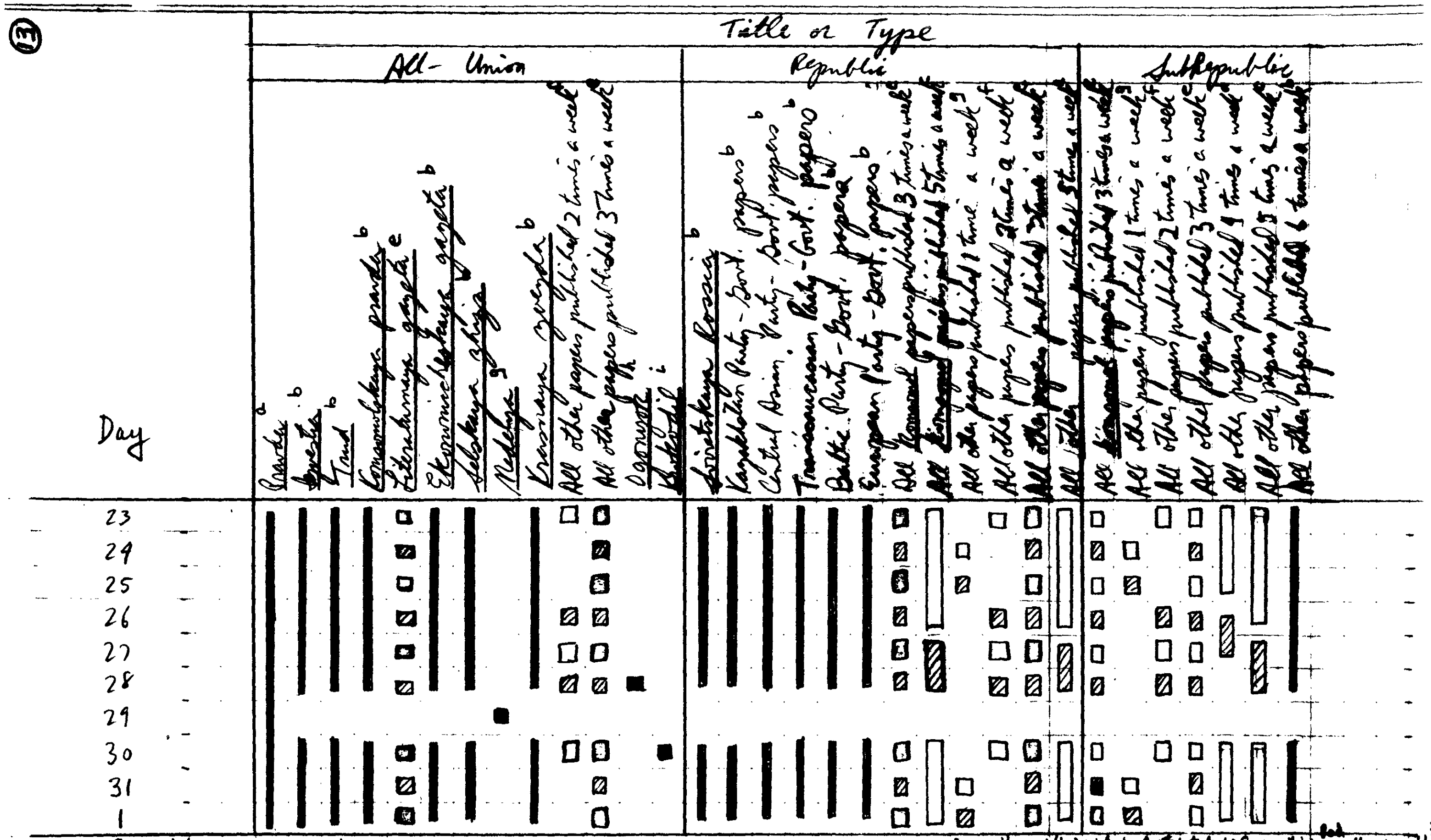
Minsk	Moscow	Molotov	Kiev	Kharkov	Stalingrad	Tibilis	Baku

These target areas were used to define, in part, the format factors of messages appearing in each simulated RL medium.

Message Schedules and Methods of Inference Used in Constructing the Scenarios

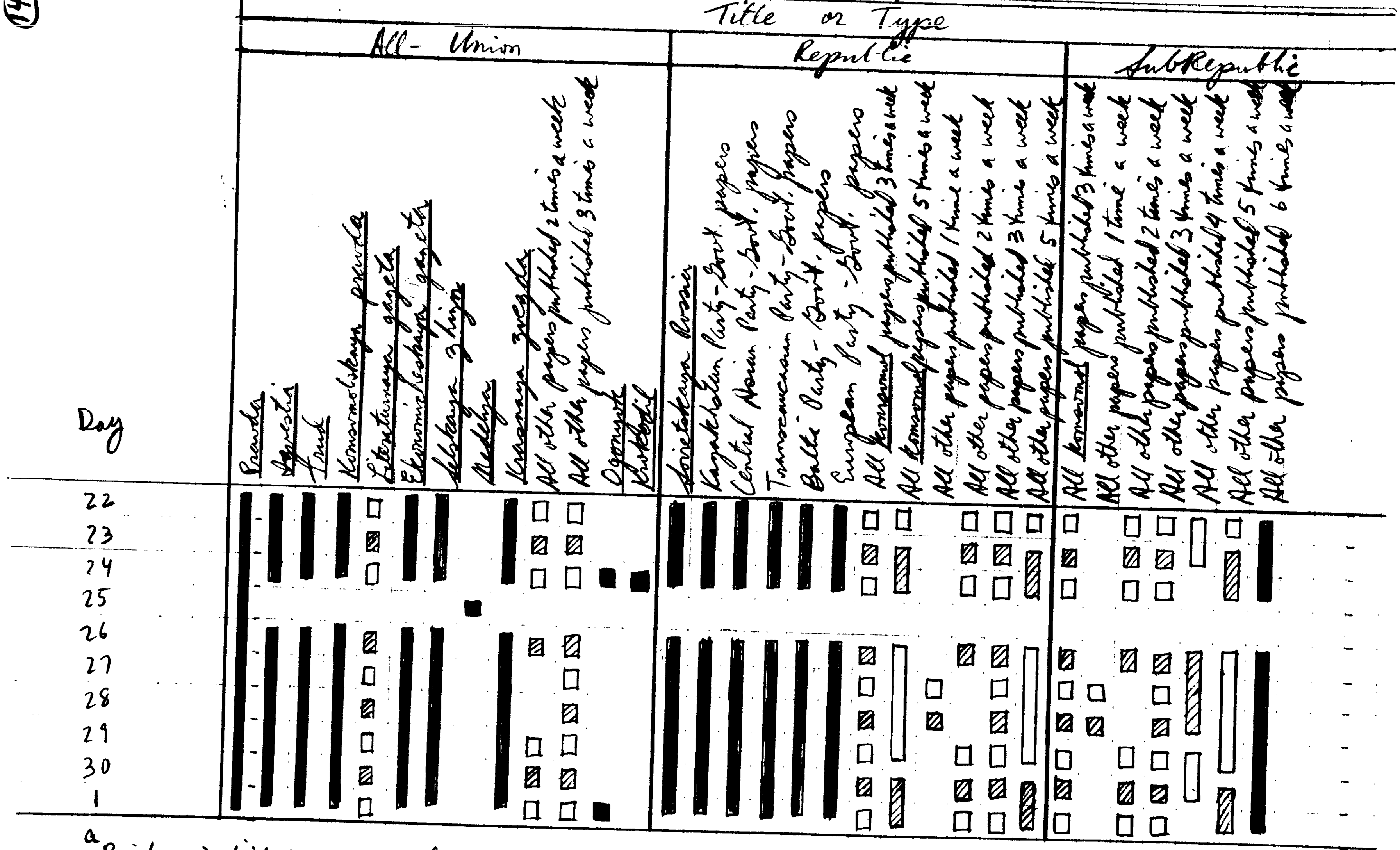
By combining the message schedules that were in effect for each simulated medium during the Cuban missile crisis and after President Kennedy's assassination with content analyzed samples of material carried by some of the media in the simulation during these two periods we were able to infer, for each theme of interest, a likely pattern of message appearances over all of the media in the simulation. The methods by which these inferences were made, as well as the message schedules that were in effect, are summarized below for Soviet print and electronic media (Tables B.7-B.14) and for radio transmissions to the USSR from abroad (Tables B.15-B.22).

TABLE B.7 -- Publication of Soviet newspaper editions, by day and title or type, October 23d - November 1st, 1962



[a] Published seven days a week.
[b] Assumed all papers published six days a week appeared on Tuesday through Sunday. This and all other print periodicals [illegible] from a conversation with Paul Cox, a Harvard University [illegible] the USSR.
[c] Assumed half the papers published five days a week appeared on Tues. through Sat. and half on Sun., Tues., Wed., Thurs., and Fri.
[d] Assumed half the papers published four days a week appeared on Tues. Wed. Thurs. and Fri. and half on Tues., Wed., Thurs., and Sat.
[e] Assumed half the papers published three days a week appeared on Sun., Wed., and Fri. and half on Tues., Thurs., and Sat.
[f] Assumed half the papers published two days a week appeared on Tues. and Sat. and half on Sun. and Fri.
[g] Assumed half the papers published one day a week appeared on Wed. and half on Thurs.
[h] Published one day a week, on Sunday.
[i] Published every ten days.

TABLE B.8-- Publication of Soviet newspaper editions, by day and title or type, November 22d-December 1st, 1963[a]



[a] Print periodicities were based on assumptions outlined in footnotes to table B.7.

Table B.9--Methods and assumptions used to construct a likely pattern of message appearances over the print media in the simulation.[a]

Media that Were Content Analyzed[b]	On the Basis of Which Content Was Inferred For the Following Simulated Media	Method of Inference[c]
Pravda	Pravda	Assumed that the pattern of message appearances for a given theme in each simulated medium over the ten day period was the same as the pattern of message appearances for that theme over the same period in the corresponding medium that was content analyzed.
Izvestia	Izvestia	
Trud	Trud	
Komsomolskaya pravda	Komsomolskaya pravda	
Literaturnaya gazeta	Literaturnaya gazeta	
Ekonomicheskaya gazeta	Ekonomicheskaya gazeta	
Krasnaya zvezda	Krasnaya zvezda	
Sovietskaya Rossia	Sovietskaya Rossia	
Kazakhstanskaya pravda	Kazakhstan Party-Govt. Papers	
Sovietskaya Kirghizia	Central Asian Party-Govt. Papers	
Bakinsky Rabochi	Transcaucasian Party-Govt. Papers	
Sovietskaya Latvia	Baltic Party-Govt. Papers	
Sovietskaya Belorussia	European Party-Govt. Papers	
Ogonyok	Ogonyok	
Krokodil	Krokodil	
Pravda Izvestia	Nedelya	Treated this paper as if it were a Monday edition of Izvestia (of which there was none) and assumed that, for a given theme, the distribution of total messages by daily edition in Izvestia over the ten day period paralleled the corresponding distribution for that theme in Pravda over the same period.

[a]These methods and assumptions were used for each theme in the Cuban crisis and the Kennedy assassination.

[b]Obtained editions of each publication for the periods Oct. 23-Nov. 1, 1962 and Nov.22-Dec. 1, 1963 from the Harvard University Russian Research Center.

[c]The inferential procedure was based on assumptions (1) that Soviet press content becomes increasingly parochial in nature (see Chapter I, p. 76) as one traverses down the territorial administrative levels, and (2) that both events simulated were of general import within the USSR.

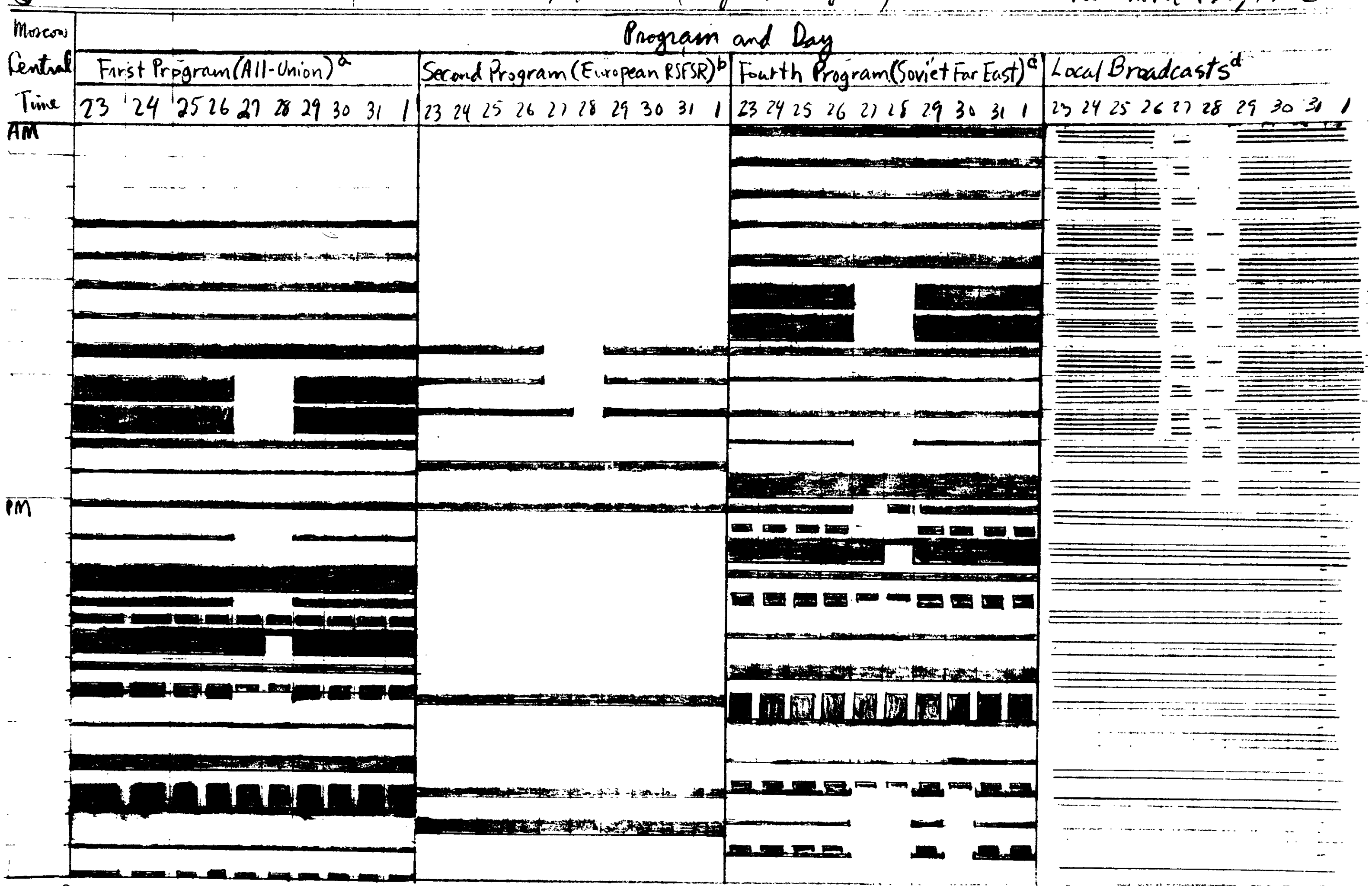
Table B-9--Continued

Media that Were Content Analyzed	On the Basis of Which Content Was Inferred For the Following Simulated Media	Method of Inference
Pravda Izvestia Trud Komsomolskaya pravda Literaturnaya gazeta	All other All-Union papers published two per week All other All-Union papers published three per week	Assumed that the total number of messages conveying a given theme in each of the two simulated media over the ten day period was the same as the average total number of messages conveying that theme over the same period in the five media that were content analyzed. Assumed that, for a given theme, the distribution of total messages by daily edition in each of the two simulated media over the ten day period paralleled the corresponding distribution for that theme in Pravda over the same period.
Pravda Izvestia Trud Komsomolskaya pravda Literaturnaya gazeta Sovietskaya Rossia Kakhstanskaya pravda Sovietskaya Kirghizen Bakinsky Rabochi Sovietskaya Latvia Sovietskaya Belorussia	All other Republic papers published one per week All other Republic papers published two per week All other Republic papers published three per week All other Republic papers published five per week	Assumed that the ratio of (1) the average total no. of messages conveying a given theme over the ten day period in Pravda and Izvestia to (2) the corresponding average in the six Republic Party-Govt. papers that were content analyzed was the same as the corresponding ratio for (1) either All-Union papers published two per week or All-Union papers published three per week and (2) any of the four simulated media. Assumed that, for a given theme, the distribution of total messages by daily edition in each of the four simulated media over the ten day period paralleled the corresponding distribution for that theme in Sovietskaya Rossia over the same period.
	Selskaya zhizn	Assumed that the total number of messages conveying a given theme in the simulated medium was the same as the total number of messages conveying that theme over the same period in any of the four nonParty-Govt. Republic papers. Assumed that, for a given theme, the distribution of total messages by daily edition in the simulated medium over the ten day period paralleled the corresponding distribution for that time over the same period in Sovietskaya Kirghizia, the most rural Republic paper content analyzed.

Table B.9--Continued

Media that Were Content Analyzed	On the Basis of Which Content Was Inferred For the Following Simulated Media	Method of Inference
Pravda Izvestia Trud Komsomolskaya pravda Literaturnaya gazeta Sovietskaya Rossia Kazakhstanskaya pravda Sovietskaya Kirghizia Bakinsky Rabochi Sovietskaya Latvia Sovietskaya Belorussia	All Republic komsomol papers published three per week All Republic komsomol papers published five per week All subRepublic komsomol papers	Assumed that the ratio of (1) the average total number of messages conveying a given theme over the ten day period in Pravda and Izvestia to (2) the corresponding average in the six Republic Party-Govt. papers that were content analyzed was the same as the corresponding ratio for (1) Komsomolskaya pravda and (2) either Republic komsomol papers published three per week or Republic komsomol papers published five per week. Assumed that this latter ratio was the same as the corresponding ratio for (1) either group of Republic komsomol papers and (2) subRepublic komsomol papers. Assumed that, for a given theme, the distribution of total messages by daily edition in each of the three simulated media over the ten day period paralleled the corresponding distribution for that theme in Komsomolskaya pravda over the same period.
	All other subRepublic papers published one per week All other subRepublic papers published two per week All other subRepublic papers published three per week All other subRepublic papers published four per week All other subRepublic papers published five per week All other subRepublic papers published six per week	Assumed that the ratio of (1) the total number of messages conveying a given theme over the ten day period either in All-Union papers published two per week or All-Union papers published three per week to (2) the corresponding figure in any of the four non-Party-Govt. Republic papers was the same as the corresponding ratio for (1) any of the four nonParty-Govt. Republic papers and (2) any of the six subRepublic papers. Assumed that, for a given theme, the distribution of total messages by daily edition in each of the six simulated media over the ten day period paralleled the corresponding distribution for that theme in Sovietskaya Kirghizia over the same period.

TABLE B.10 -- Newsbroadcasting on Soviet radio, by time of day and Program, October 23d - November 1st, 1962



[a] Adapted from: Durham, News Broadcasting, Chart III, p. 13.

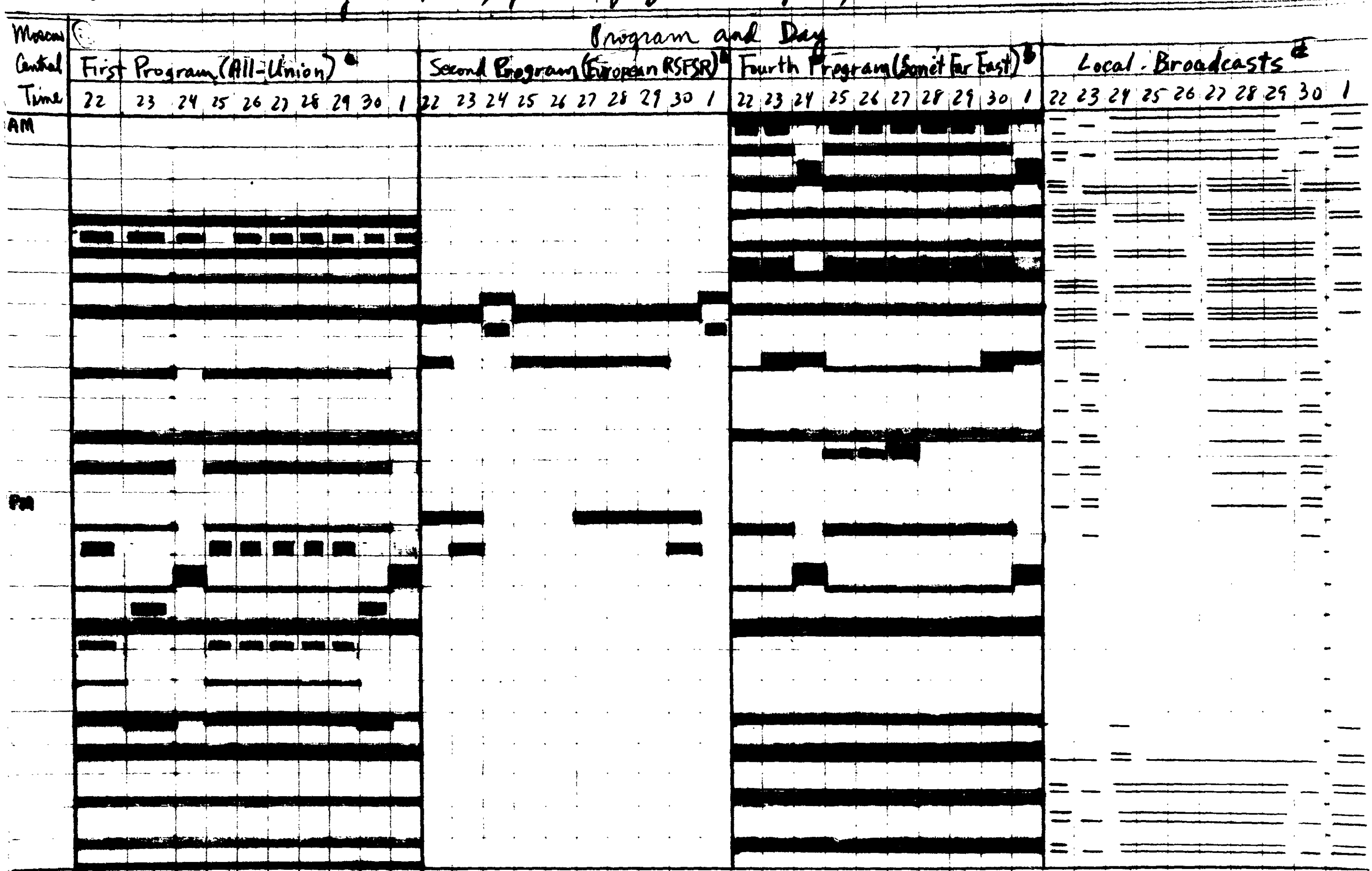
[b] Constructed by setting the ~~total~~ number of newscasts equal ~~to the total~~ (number found for Program II over an eight day Radio Liberty monitoring period ("An Eight-Day Analysis of News Programmes on the Soviet Radio," quoted in Durham, Radio and Television, p. 112), and by locating newscasts as closely as possible to the average times of day at which local newscasts occurred in Moscow, Leningrad and Kiev (Durham, News Broadcasting, pp. 15-16).

Table B.10--Continued

[c]Constructed by setting the total number of newscasts equal to the number found for program IV over an eight day Radio Liberty monitoring period ("An Eight-Day Analysis," quoted in Durham, Radio and Television, p. 113), by locating a Fourth Program newscast three hours earlier (Moscow Central Time) than each First Program newscast, and by locating the remaining Fourth Program newscasts at the remaining unfilled hours of the day (Moscow Central Time).

[d]Constructed by creating, for each newscast on the Second Program, eleven corresponding local newscasts--one at the same time, as, one an hour later than, and one in each of the nine hours preceding the corresponding Second Program newscast (Moscow Central Time),--in accordance with the eleven meridians or time zones encompassed by the bulk of the USSR.

TABLE B.11 -- Newsbroadcasting on Soviet radio, by time of day and Program, November 22d - December 1st, 1963



[a]Adapted from: Durham, News Broadcasting, Chart III, p.13.
[b]Adapted from: Durham, News Broadcasting, App. II, p.63.
[c]Constructed in the manner described in footnote d, Table B.10.

Table B.12--Methods and assumptions used to construct a likely pattern of message appearances over Soviet radio media in the simulation.[a]

Media Material Content Analyzed[b]	On the Basis of Which Content Was Inferred for the Following Simulated Media	Method of Inference[c]
All-Union radio transmissions	Early morning All-Union radio (5:30-8:29 a.m.) Early morning Republic and subRepublic radio (5:30-8:29 a.m.) Mid-morning All Union, Republic and subRepublic radio (8:30-11:59 a.m.) Mid-day All-Union radio (noon-2:59 p.m.) Mid-day Republic and subRepublic radio (noon-2:59 p.m.) Afternoon All-Union, Republic and subRepublic radio (3:00-5:59 p.m.) Early evening All-Union radio (6:00-9:29 p.m.) Early evening Republic and subRepublic radio (6:00-9:29 p.m.) Late evening All-Union radio (9:30 p.m.-5:29 a.m.) Late evening Republic and subRepublic radio (9:30 p.m.-5:29 a.m.)	Defined simulation time period n as running from 4:00 a.m., day n to 3:59 a.m., day n+1. Assumed that each message in the monitoring reports was carried (1) by all scheduled radio newscasts occurring on Programs I and II during that portion of the day (5:30 - 8:29 a.m., 8:30 - 11:59 a.m., etc., Moscow Central time) in which the monitored message was broadcast, (2) by all scheduled radio newscasts occurring on program IV during that portion of the day in which a message would have reached the Far East if it had been broadcast from Moscow three hours earlier than the monitored message, and (3) by all scheduled Republic and subRepublic radio newscasts occurring during the same portion of the day (local time) in which the monitored message was broadcast (Moscow Central Time), except those local newscasts occurring earlier (Moscow Central Time) than the theme could possibly have been disseminated.

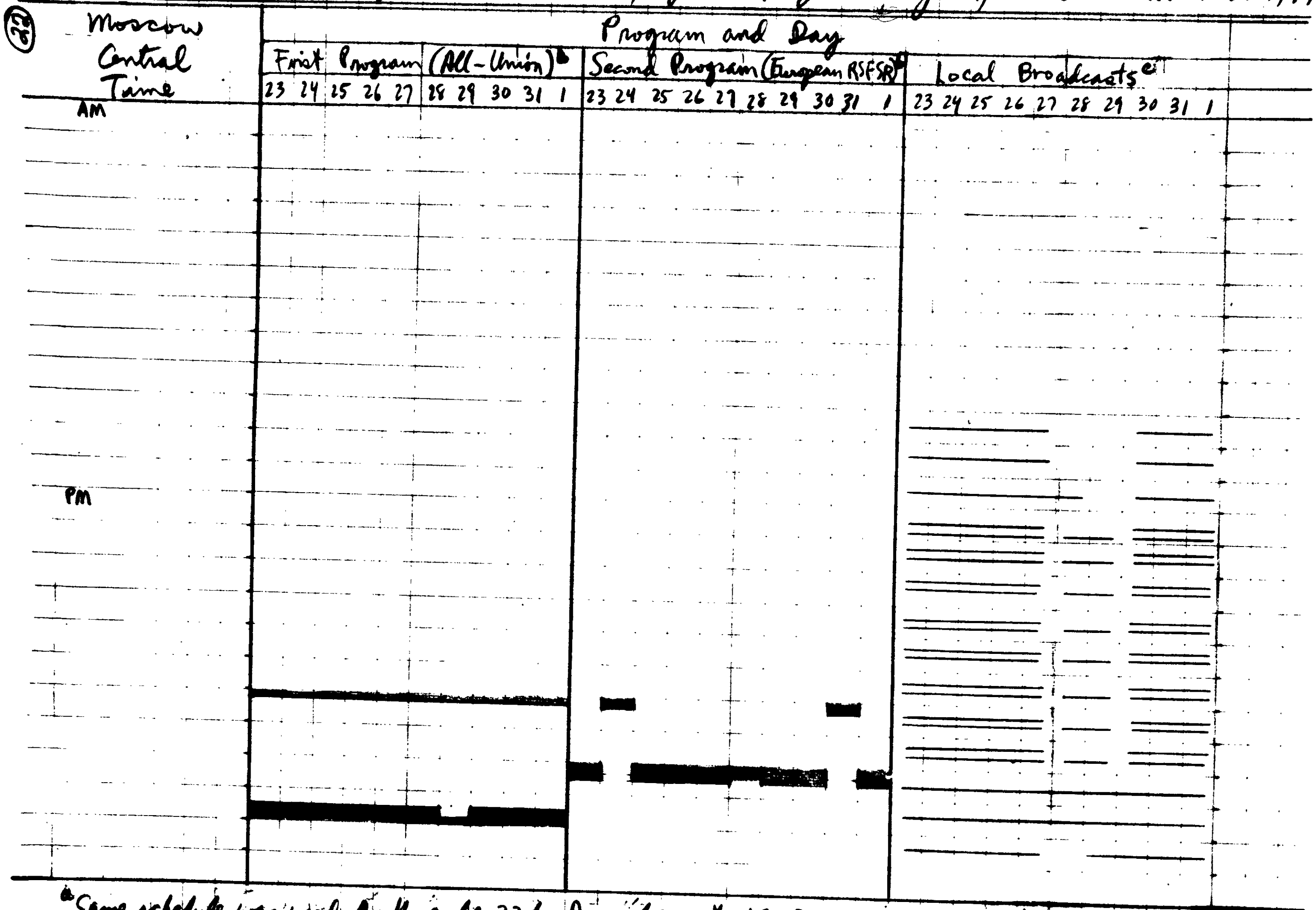
Table B.12--Continued

[a]These methods and assumptions were used for each theme in the Cuban crisis and the Kennedy assassination.

[b]Obtained, from FBIS monitoring reports, a sample of the material broadcast by Moscow Domestic Service during the periods October 23rd-November 1st,1962 and November 22nd-December 1st, 1963.

[c]The inferential procedure was based on the assumption that All-Union radio broadcasts formed the basis of radio broadcast content in the localities (see, e.g., Durham, Radio and Television, p. 54).

TABLE B.13 -- Newsbroadcasting on Soviet Television, by time of day and Program, October 23d - November 1st, 1962 [a]



[a] Same schedule was used for November 22d - December 1st, 1963.

[b] Constructed by locating newscasts as close as possible to the average times of day at which First Program newscasts occurred in Moscow, Leningrad, Kiev, Odessa, and Lugansk during 1964 (Durham, Radio and Television, Chart III.F., p. 120 and News Broadcasting, Chart X, p. 42).

[c] Constructed in a manner analogous to that described in footnote d, Table B.10.

Table B.14--Methods and assumptions used to construct a likely pattern of message appearances over Soviet television media in the simulation.[a]

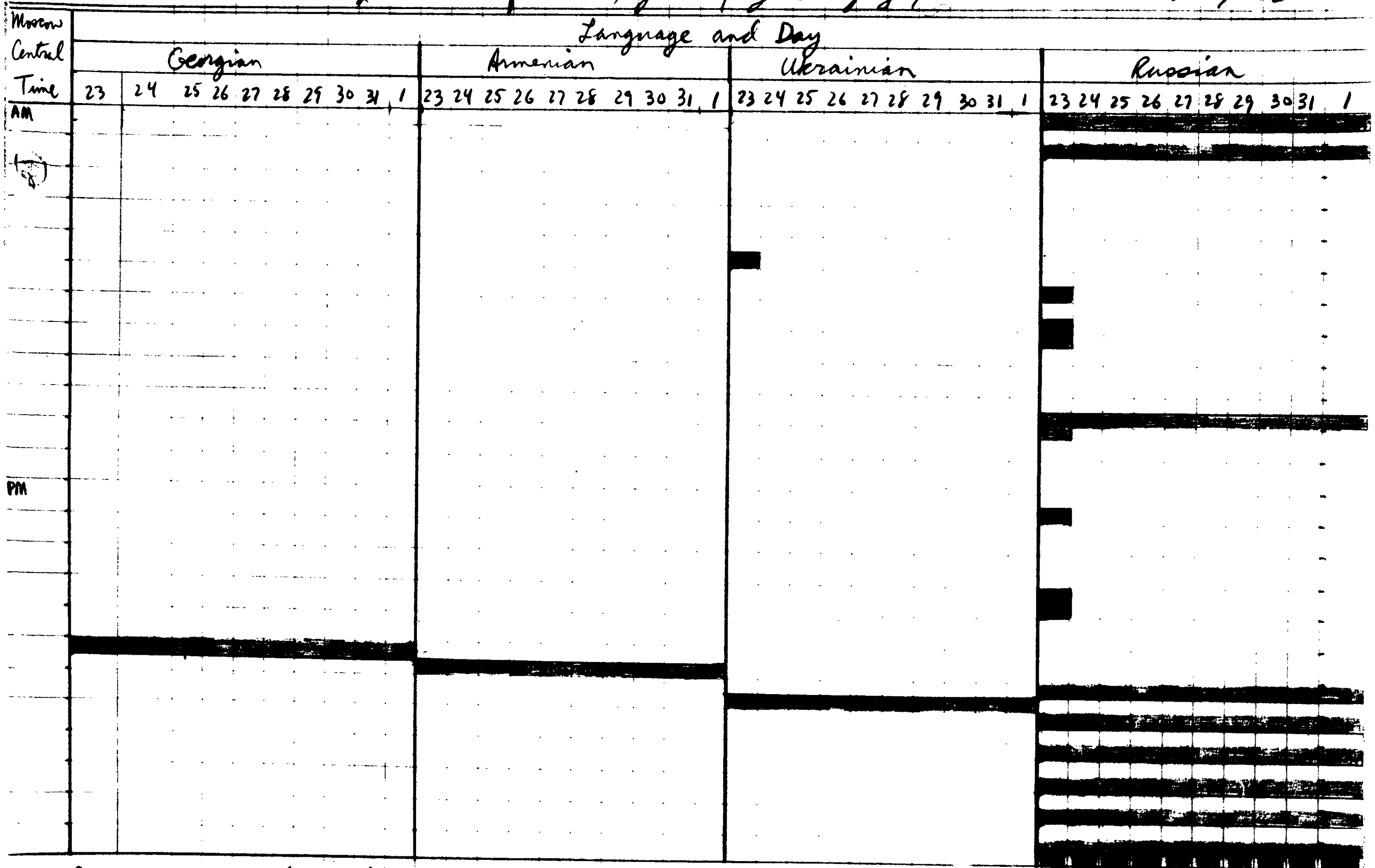
Media Material Content Analyzed[b]	On the Basis of Which Content Was Inferred for the Following Simulated Media	Method of Inference[c]
All-Union radio transmissions	Daytime All-Union television (11:00 a.m.-5:59 p.m.)	Assumed that each message in the monitoring reports was carried (1) by all scheduled television newscasts occurring on Programs I and II during that portion of the day (5:30-8:29 a.m., 8:30-11:59 a.m., etc., Moscow Central Time) in which the monitored radio message was broadcast, and (2) by all scheduled Republic and subRepublic television newscasts occurring during the same portion of the day (local time) in which the monitored radio message was broadcast (Moscow Central Time), except those local television newscasts that occurred earlier (MCT) than the monitored message. Assumed their counterparts on the following day carried the message.
	Daytime Republic and subRepublic television (11:00 a.m.-5:59 p.m.)	
	Evening All-Union television (6:00 p.m.-midnight)	
	Evening Republic and subRepublic television (6:00 p.m.-midnight)	

[a]These methods and assumptions were used for each theme in the Cuban crisis and the Kennedy assassination.

[b]In the absence of available data on Soviet television broadcasts during the two periods being simulated, we were forced to use FBIS radio monitoring reports as an indicator of television as well as radio coverage.

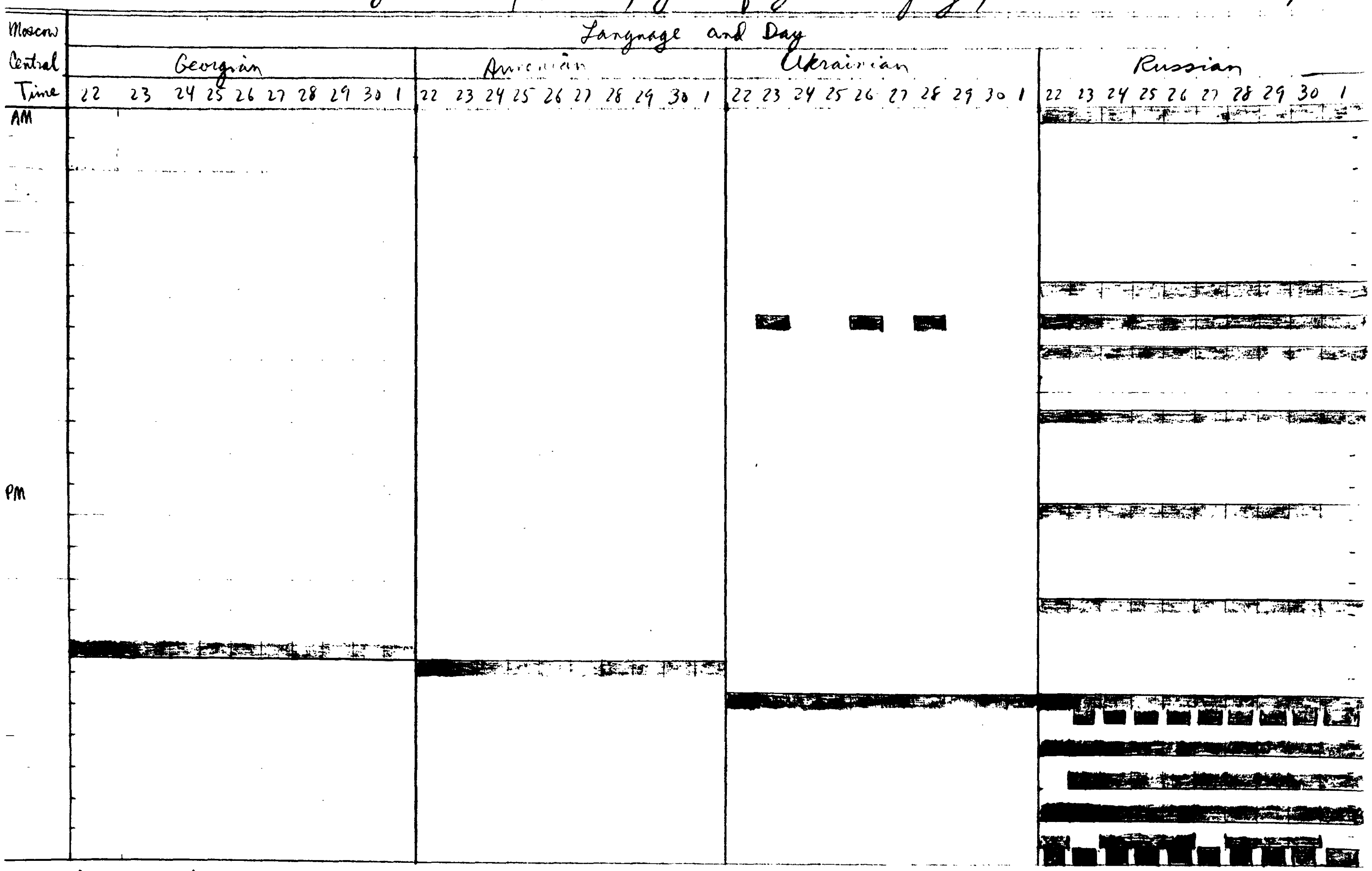
[c]The inferential procedure was based on the assumptions (1) that the thematic treatment of the Cuban crisis and the Kennedy assassination by Soviet television closely resembled the thematic treatment of these two events by Soviet radio, and (2) that All-Union television broadcasts formed the basis of television broadcast content in the localities (see, e.g., Rogers, "The Soviet Audience," p. 83).

TABLE B.1[illegible] -- Newsbroadcasting on Voice of America, by time of day and language, October 23d - November 1st, 1962 [a]



[a] Adapted from: VOA broadcast schedules supplied by the United States Information Agency. Assumed a total of six and one-half hours of regular broadcasting per day.

TABLE B.16-- Newsbroadcasting on Voice of America, by time of day and language, November 22d- December 1st, 1963[a]



[a] Adapted from: VOA broadcast schedules supplied by the United States Information Agency. Assumed a total of eight and one-half hours of regular broadcasting per day.

Table B.17--Methods and assumptions used to construct a likely pattern of message appearances over Voice of America media in the simulation.[a]

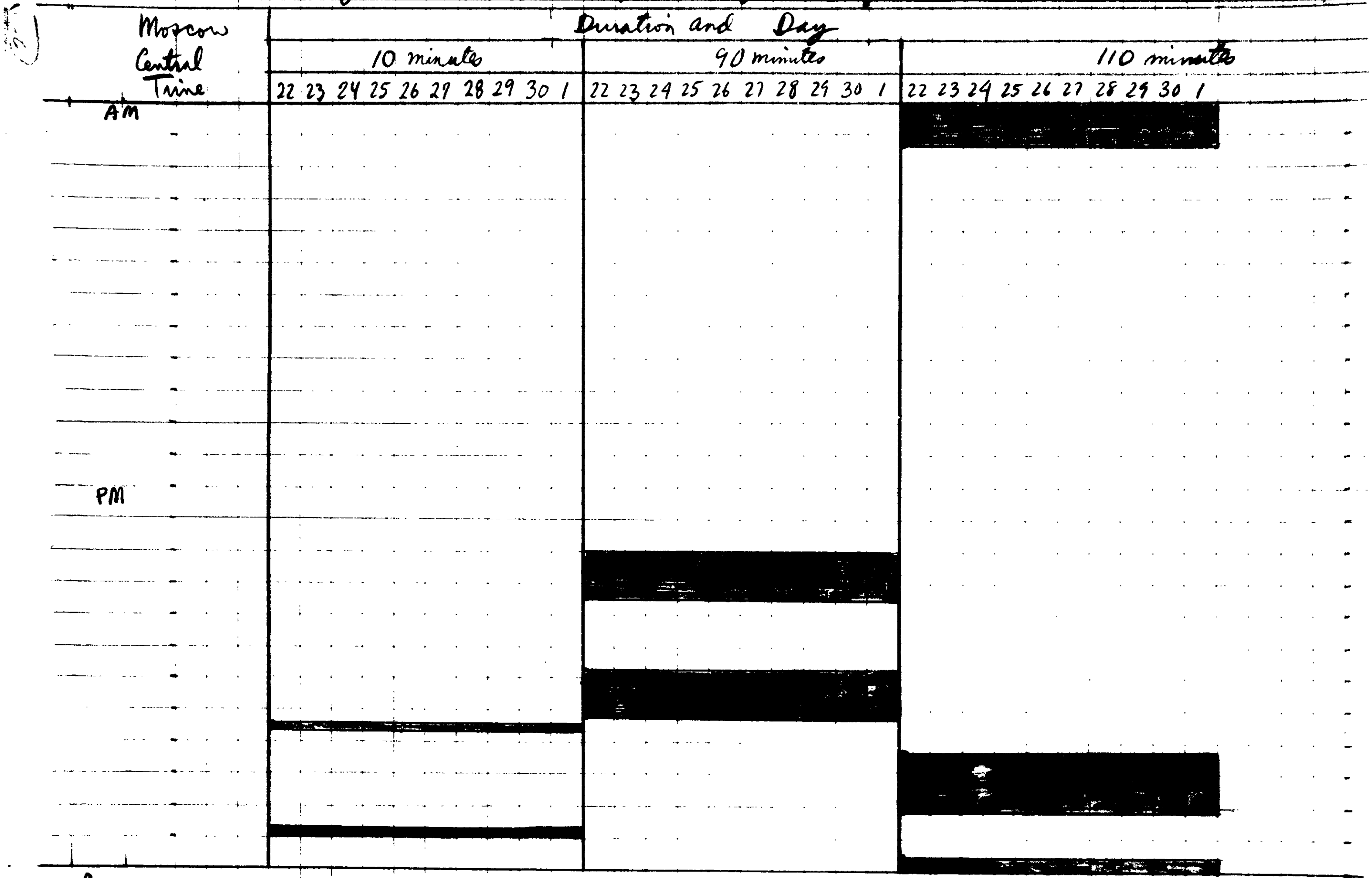
Media Material Content Analyzed[b]	On the Basis of Which Content Was Inferred for the Following Simulated Media	Method of Inference[c]
Voice of America scripts	Early morning VOA (4:00-7:59 a.m.) Daytime VOA (8:00 a.m.-7:59 p.m.) Evening VOA (8:00 p.m.-3:59 a.m.)	Assumed that each message in a Voice of America script was carried by all scheduled VOA newscasts, transmitted to the Soviet Union (1) during the hour of the "broadcast day" (5:00 p.m.-4:59 p.m., Moscow Central time) in which the script was first broadcast and (2) during each of the subsequent hours of the day in which the script was rebroadcast.

[a]These methods and assumptions were used for each theme in the Cuban crisis and the Kennedy assassination.

[b]VOA scripts for the periods October 23rd-November 1st, 1962 and November 22nd-December 1st, 1963 were supplied us by the United States Information Agency.

[c]The inferential procedure was based on the assumption that the thematic treatment of the Cuban crisis and the Kennedy assassination was roughly the same in each of the four different language broadcasts transmitted to the Soviet Union by the VOA.

TABLE B.18-- Newsbroadcasting on the British Broadcasting Corporation, by time of day and duration, November 22d-December 1st, 1963[a]



[a] Adapted from: Broadcast schedules supplied by the BBC's European Service. Same schedule was used for October 23d-November 1st, 1962.

Table B.19--Methods and assumptions used to construct a likely pattern of message appearances over British Broadcasting Corporation media in the simulation.[a]

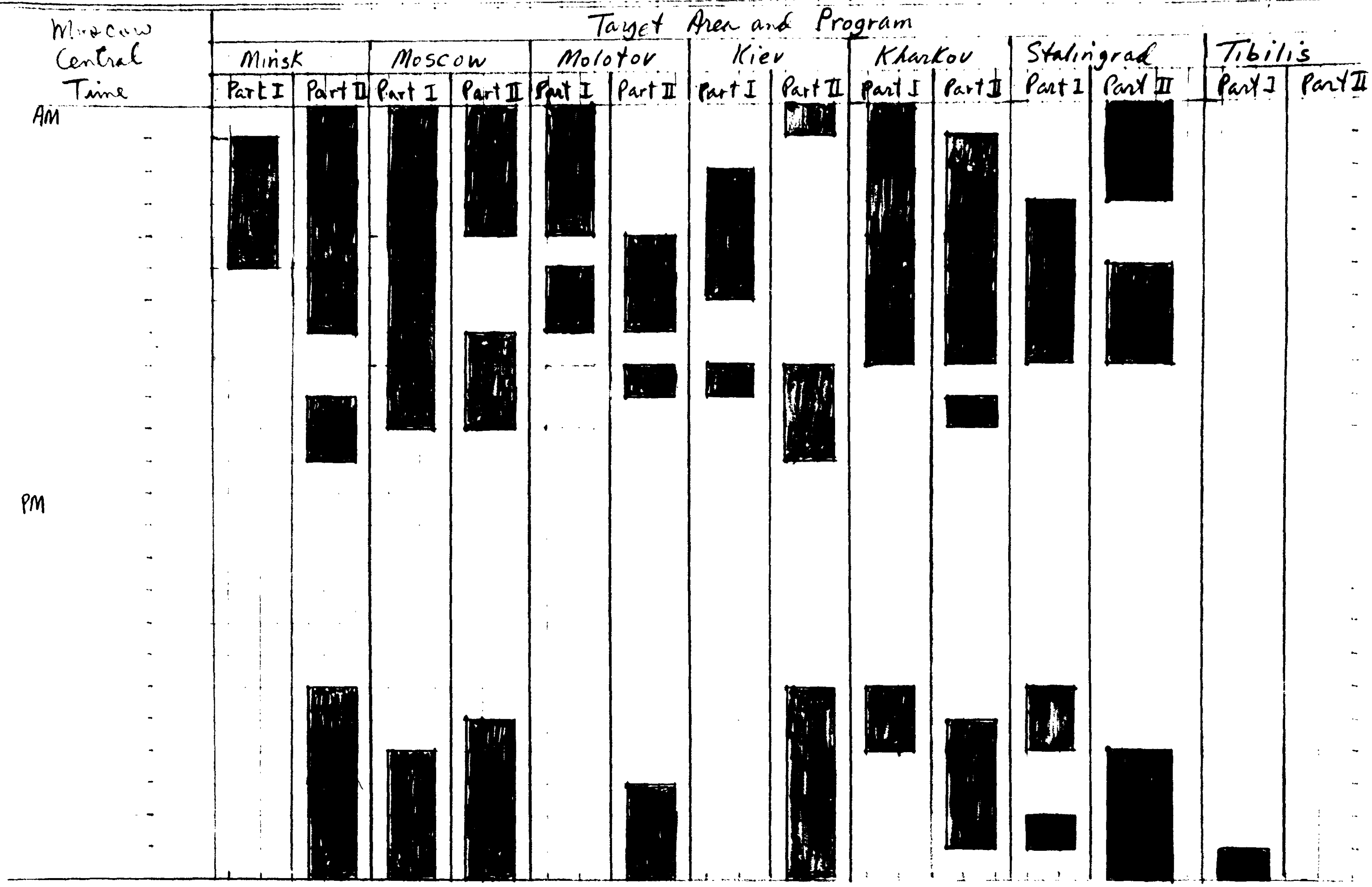
Media Material Content Analyzed[b]	On the Basis of Which Content Was Inferred for the Following Simulated Media	Method of Inference[c]
London Times	Early morning BBC (4:00-7:59 a.m.) Daytime BBC (8:00 a.m.-7:59 p.m.) Evening BBC (8:00 p.m.-3:59 a.m.)	Assumed that each relevant message in a given edition of the London Times was carried by all the scheduled BBC newscasts transmitted to the Soviet Union during the "broadcast day" (2:00 p.m.-2:00 a.m., Moscow Central Time) on which that edition of the Times was published.

[a]These methods and assumptions were used for each theme in the Cuban crisis and the Kennedy assassination.

[b]In the absence of available data on British Broadcasting Corporation transmissions to the Soviet Union during the two periods being simulated, we were forced to use London Times editions as an indicator of BBC coverage. London Times editions for the periods October 23rd-November 1st, 1962 and November 22nd-December 1st, 1963 were obtained at the Boston Public Library.

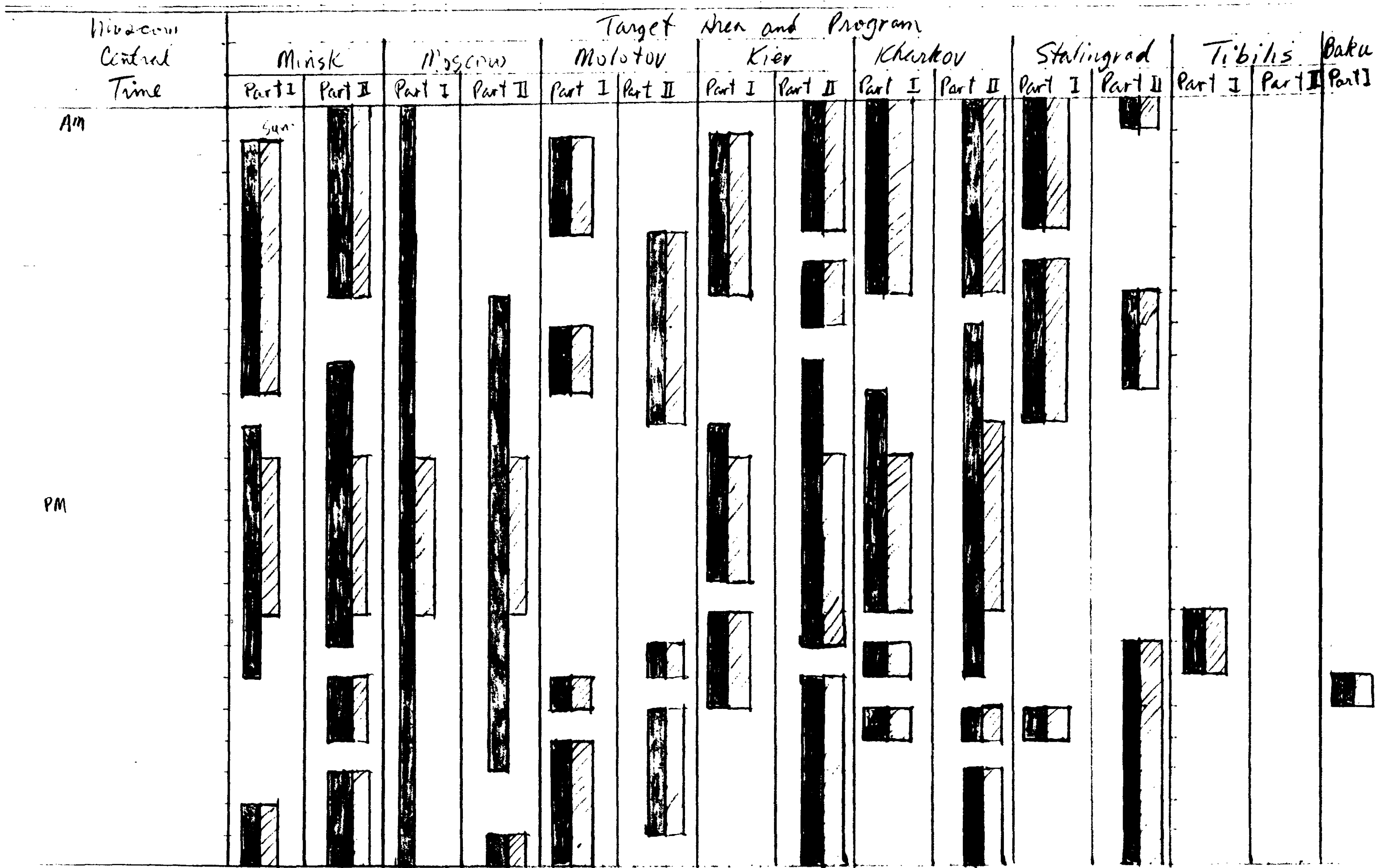
[c]The inferential procedure was based on the assumptions (1) that the thematic treatment of the Cuban crisis and the Kennedy assassination by BBC in its broadcasts to the Soviet Union closely resembled the thematic treatment of these two events by the London Times, (2) that the 1962 schedule of BBC broadcasts to the USSR (which was unavailable) was substantially the same as the 1963 schedule, (3) that the thematic treatment of the Cuban crisis and the Kennedy assassination was roughly the same in each of the three different length broadcasts transmitted to the Soviet Union by the BBC, and (4) that the second ninety minute newscast and the second 110 minute newscast were transmitted to the Soviet Far East as well as to the Western portion of the USSR.

TABLE B20-- News broadcasting on Radio Liberty, by time of day, target area, and Program, October 23d - November 1st, 1962 [a]



[a] Adapted from: Broadcast schedules supplied by the Radio Liberty Committee.

TABLE B.21 -- Newsbroadcasting on Radio Liberty, by time of day, target area, and Program November 22d-December 1st, 1963[a]



[a] Adapted from: Broadcast schedules supplied by the Radio Liberty Committee.

Table B.22--Methods and assumptions used to construct a likely pattern of message appearances over Radio Liberty media in the simulation.[a]

Media Material Content Analyzed[b]	On the Basis of Which Content was Inferred for the Following Simulated Media	Method of Inference[c]
Radio Liberty scripts	Early morning RL (4:00-7:59 a.m.) Daytime RL (8:00 a.m.-7:59 p.m.) Evening RL (8:00 p.m.-3:59 a.m.)	Assumed that each message in a Radio Liberty script was carried by all scheduled RL newscasts transmitted to the Soviet Union (1) during the hour of the "Broadcast day" (6:00 p.m.-5:59 p.m., Moscow Central Time) in which the script was first broadcast and (2) during each of the subsequent hours of the day in which the script was rebroadcast.

[a]These methods and assumptions were used for each theme in the Cuban crisis and the Kennedy assassination.

[b]RL scripts for the periods October 23-November 1st, 1962 and November 22nd-December 1st, 1963 were supplied us by the Radio Liberty Committee.

[c]The inferential procedure was based on the assumption that the thematic treatment of the Cuban crisis and the Kennedy assassination was roughly the same in each of the eight target area broadcasts transmitted to the Soviet Union by RL.

SELECTED BIBLIOGRAPHY

Computer Simulation in the Behavioral Sciences

Abelson, Robert P. Letter to Ithiel de Sola Pool. July 25, 1964.

Abelson, Robert P., and Bernstein, Alex. "A Simulation Model of Community Referendum Controversies." Public Opinion Quarterly, XXVII (1963).

Abelson, Robert P. "Simulation of Social Behavior." The Handbook of Social Psychology. Edited by Gardner Lindzey and Elliot Aronson. II. Reading, Mass.: Addison-Wesley, 1968.

Abelson, Robert P. "The Use of Surveys in Simulations." AAPOR Conference. 1962.

Baner, Raymond A., and Buzell, Robert D. "Mating Behavioral Science and Simulation." Harvard Business Review. XLII, No. 5 (1964).

Browning, Rufus P. Computer Programs as Theories of Political Processes. Reprint No. 30. Madison: Social Systems Research Institute, University of Wisconsin, 1962.

Center for International Studies, M.I.T. Program on Problems of International Communications and National Security. Status Report, October, 1965. (Mimeographed.)

Center for International Studies, M.I.T. Studies in International Communication. Research Report: 1964-65. Cambridge: Center for International Studies, M.I.T., 1966.

Coleman, James S. "Social Simulation." (Mimeographed.)

Gullahorn, John T., and Gullahorn, Jeanne E. "Some Computer Applications in Social Science." American Sociological Review, XXX, No. 3 (1965).

Hanon, Bernard. "The Use of Simulation in the Analysis of Business Systems." The American Behavioral Scientist, VIII, No. 9 (1965).

Heau, Ernest. Comcom Simulation: Pass II. Comcom Project, Simulation Memorandum #2. July, 1963. (Mimeographed.)

Journal of Advertising Research.

Journal of Marketing Research.

Kramer, John F. A Computer Simulation of Audience Exposure in a Mass Media System: The United Nations Information Campaign in Cincinnati, 1947-48. Cambridge: Center for International Studies, M.I.T., July, 1969.

Kramer, John F. "The Three Distribution Case: How to Choose the Proper Number of Probabilities from Each Distribution When There Are Three Distributions." Comcom Simulation Memorandum #33. January, 1966. (Mimeographed.)

Pool, Ithiel de Sola, Abelson, Robert P., and Popkin, Samuel. Candidates, Issues & Strategies: A Computer Simulation of the 1960 and 1964 Presidential Elections. Cambridge: The M.I.T. Press, 1964.

Pool, Ithiel de Sola. Comcom Simulation: Pass I. Comcom Project Simulation Memorandum #3. Fall, 1963. (Mimeographed.)

Pool, Ithiel de Sola. Communications Simulation. Comcom Project, Simulation Memorandum #1. July 10, 1963. (Mimeographed.)

Pool, Ithiel de Sola. "Computer Simulations of Total Societies." The Study of Total Societies. Edited by Samuel Z. Klausner. Garden City: Doubleday, 1967.

Pool, Ithiel de Sola, and Kessler, Allan R. "The Kaiser, The Tsar, and the Computer: Information Processing in a Crisis." The American Behavioral Scientist, VIII, No. 9 (1965).

Pool, Ithiel de Sola, and Abelson, Robert P. "The Simulmatics Project." Public Opinion Quarterly, XXV, No. 2 (1961).

Pool, Ithiel de Sola, Kramer, John F., and Selesnick, Herbert L. "Who is Listening: Evaluating Audiences." American Statistical Association. 1965 Proceedings of the Business and Economic Statistics Section. Philadelphia, 1965.

Popkin, Samuel L. "A Model of a Communication System." The American Behavioral Scientist, VIII, No. 9 (1965).

Simulmatics Corporation. "Simulmatics Media-Mix I. General Description," New York, 1962. (Mimeographed.)

Simulmatics Corporation. "The Simulmatics Media-Mix. Technical Description." New York, 1962. (Mimeographed.)

The Soviet Mass Media System

Barghoorn, Frederick C. Soviet Foreign Propaganda. Princeton: Princeton University Press, 1964.

Barghoorn, Frederick C. The Soviet Image of the United States. New York: Harcourt Brace, 1950.

Boiter. "Audience Data Estimates." (Radio Liberty). (Mimeographed.)

Center for International Studies, M.I.T. A Program of Research on Problems of International Relations and National Security. Cambridge, 1962. (Mimeographed.)

Center for International Studies, M.I.T. A Program of Research on Problems of International Communications and National Security. Application for Renewal Funding. Cambridge, 1964. (Mimeographed.)

Center for International Studies, M.I.T. A Program of Research on Problems of International Communications and National Security. Preliminary Application for Renewal Funding. Cambridge, 1966. (Mimeographed.)

Comcom Soviet Memorandum #3. (Mimeographed.)

Comcom Soviet Memorandum #4. (Mimeographed.)

Comcom Soviet Memorandum #6. (Mimeographed.)

Comcom Soviet Memorandum #9. February, 1965. (Mimeographed.)

Durham, F. Gayle. Newsbroadcasting on Soviet Radio and Television. Cambridge: Center for International Studies, M.I.T., 1965.

Durham, F. Gayle. <u>Radio and Television in the Soviet Union.</u> Cambridge: Center for International Studies, M.I.T., 1965.

Inkeles, Alex. "Models and Issues in the Analysis of Soviet Society." <u>Survey</u>, No. 60 (July, 1966).

Inkeles, Alex. <u>Public Opinion in Soviet Russia</u>. Cambridge: Harvard University Press, 1950.

Inkeles, Alex, and Bauer, Raymond A. <u>The Soviet Citizen: Daily Life in a Totalitarian Society</u>. Cambridge: Harvard University Press, 1959.

<u>Itogi vsesoyuznoy perepisi naselyeniya 1959 goda; SSSR</u> (results of the 1959 All-Union Census of the U.S.S.R.). Moscow: Gosstatizdat, 1962.

Joint Committee on Slavic Studies. <u>Current Digest of the Soviet Press</u>, XVII (August, 1965).

Kantner, John. "A Comparison of the Current Population in the USSR and USA." <u>Soviet Society: A Book of Readings</u>. Edited by Alex Inkeles and Kent Geiger. Boston: Houghton-Mifflin, 1961.

Kramer, John F. "The Population of the Soviet Union, Broken by Age, Sex, Urban-Rural, Education, and Social Class." 1965. (Mimeographed.)

Lasswell, Harold D. "The Strategy of Soviet Propaganda." <u>The Process and Effects of Mass Communication</u>. Edited by Wilbur Schramm. Urbana: University of Illinois Press, 1955.

Lenin, Vladimir Il'ich. <u>Left Wing Communism, An Infantile Disorder</u>. New York: International Publishers, 1940.

Lenin, Vladimir Il'ich. <u>On Organization</u>. New York: International Publishers, 1929.

Lenin, Vladimir Il'ich. <u>What is to be Done</u>. New York: International Publishers, 1929.

Lorimer, Frank. "Trends in Soviet Population History." <u>Soviet Society: A Book of Readings</u>. Edited by Alex Inkeles and Kent Geiger. Boston: Houghton-Mifflin, 1961.

New York Times. "35 Million Watch Soviet Television," May 19, 1963.

Narodnoye Khozyaystvo SSR v 1964 godu (National Economy of the USSR in 1964). Moscow: Izdatyel'stvo "Statistika," 1965.

Pool, Ithiel de Sola. "Opportunities for Change: Communications with the U.S.S.R." Workshop in Communications with the Peoples of the U.S.S.R. New York University, November 20, 1965.

Rogers, Rosemarie Straüssnig. "The Soviet Audience: How It Uses the Mass Media." Unpublished Ph.D. thesis, M.I.T., 1967.

Schramm, Wilbur. Four Working Papers on Propaganda Theory. Urbana: University of Illinois, 1965.

Selznick, Philip. The Organizational Weapon: A Study of Bolshevik Strategy and Tactics. New York: McGraw-Hill, 1952.

White, Ralph K., "Social Science Research in the Soviet Bloc." Public Opinion Quarterly, XXVIII, No. 1 (1964).

Soviet Crisis Communication

Bakinsky Rabochi. October 23-31, 1962 and November 22-30, 1963.

Barghoorn, Frederick C. "The Shaping and Direction of Public Opinion," Politics in the USSR: A Country Study. Boston: Little, Brown and Company, 1966.

Bauer, Raymond A. and Gleicher, David B. "Word-of-Mouth Communication in the Soviet Union." Public Opinion Quarterly, XVII, No. 3 (1964).

British Broadcasting Corporation. Programming schedules for broadcasts to the USSR during 1963.

Buzek, Anton. How the Communist Press Works. New York: Praeger, 1964.

Cantril, Hadley. Soviet Leaders and Mastery Over Man. New Brunswick, New Jersey: Rutgers University Press, 1960.

The Congressional Quarterly Weekly Report, XX, No. 43 (1962).

The Congressional Quarterly Weekly Report, XXI, No. 48 (1962).

Crane, Robert D. "The Cuban Crisis: A Strategic Analysis of American and Soviet Policy." _Orbis_, VI, No. 4 (1963).

Dunning, John L. "The Kennedy Assassination As Viewed by Communist Media." _Journalism Quarterly_, LVI (Spring, 1964).

Durham, F. Gayle. "Scenario--Cuban Crisis." Comcom memorandum, M.I.T., 1966. (Mimeographed.)

Ekonomicheskaya gazeta. October 23-31, 1962 and November 22-30, 1963.

Leonid Finkelstein. Private interview. Cambridge: Center for International Studies, M.I.T., 1967.

Foreign Broadcast Information Service. Foreign Radio Broadcasts. _Daily Report_. Nos. 207-14 and 229-32. Washington, D.C.: Foreign Broadcast Information Service, 1962-63.

Hollander, Gayle Durham. "Communications and Social Modernization in the Soviet Union." Unpublished Ph.D. thesis, M.I.T., 1968.

Izvestia. October 23-31, 1962 and November 22-30, 1963.

Joint Committee on Slavic Studies. _Current Digest of the Soviet Press_, XIV, Nos. 43 and 44 (1962), and XV, Nos. 46-49 (1963).

Kazakhstanskaya pravda. October 23-31, 1962 and November 22-30, 1963.

Kecskemeti, Paul. "Totalitarian Communications as a Means of Control." _Public Opinion Quarterly_, XIV, No. 2 (1950).

Komsomolskaya pravda. October 23-31, 1962 and November 22-30, 1963.

Krasnaya zvezda. October 23-31, 1962 and November 22-30, 1963.

Krokodil. October 23-31, 1962 and November 22-30, 1963.

Literaturnaya gazeta. October 23-31, 1962 and November 22-30, 1963.

London Times, October 4-31, 1962, and November 22-30, 1963.

M., C. "Kennedy Assassination--Communist Version." Communist Affairs, I (Nov.-Dec., 1963).

Ogonyok. October 23-31, 1962 and November 22-30, 1963.

Pravda. October 23-31, 1962 and November 22-30, 1963.

Radio Liberty Committee. Microfilms of Russian language broadcasts to the USSR during October, 1962 and November, 1963, and programming schedules.

Rogers, Rose Marie Straüssnig. How Russians Read Their Press: Patterns of Selection in Pravda and Izvestia. Cambridge: Center for International Studies, M.I.T., 1969.

Rossi, Peter H., and Bauer, Raymond A. "Some Patterns of Soviet Communications Behavior." Public Opinion Quarterly, XVI, No. 4 (1953).

Schramm, Wilbur, ed. One Day in the World's Press. Stanford: Stanford University Press, 1959.

Sovietskaya Belorussia. October 23-31, 1962 and November 22-30, 1963.

Sovietskaya Kirghizia. October 23-31, 1962 and November 22-30, 1963.

Sovietskaya Latvia. October 23-31, 1962 and November 22-30, 1963.

Sovietskaya Rossia. October 23-31, 1962 and November 22-30, 1963.

Trud. October 23-31, 1962 and November 22-30, 1963.

U.S., Department of State Bulletin, XLVII, Nos. 1217 and 1220 (1962).

U.S. Information Agency. Voice of America. Transcripts of broadcasts to the USSR during October, 1962 and November, 1963, and programming schedules.

BIOGRAPHICAL NOTE

The author attended Tufts University at Medford, Massachusetts, during the year 1958-59, and the Massachusetts Institute of Technology during the years 1959-62, majoring in physics, and received a B.S. in 1962. He attended the Massachusetts Institute of Technology during the years 1962-64, majoring in industrial management, and received an M.S. in 1964. He attended the Massachusetts Institute of Technology during the years 1964-70 and received a Ph.D. in political science in 1970. The author is a senior associate of an international management consulting firm, Harbridge House, Inc., on whose professional staff he has served since 1967. With Professors Ithiel de Sola Pool and John F. Kramer he is the coauthor of a paper entitled "Who is Listening: Evaluating Audiences," which was delivered to the 1965 proceedings of the American Statistical Association.